

AUGUST 1962

Vol. 7, No. 4

35 cents

Precision SHOOTING



a magazine for Shooters by Shooters

Precision Shooting is published monthly by Precision Shooting, Inc.

Editorial and business office at 64 Depot Street, Lyndonville, Vt.

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Subscription rates:—To the U. S., Canada and Mexico, 1 year \$4.00, 2 years \$7.00, 3 years \$9.00. All other countries \$1.00 per year additional.

Change of address requires 30 days' notice.

Place of Publication—Cowles Press, Inc., 83 Eastern Ave., St. Johnsbury, Vermont. Second-class postage paid at St. Johnsbury, Vt.

THE COVER PHOTO

The new rifle range of the Wigwam Gun Club, Inc. at Thomaston, Connecticut.

The range has 25 rifle firing points and can be used with any caliber rifle to 200 yards. Ten heavy, stable shooting benches may be moved onto the firing line for bench rest shooting. It is planned to put a permanent cover over the firing line in the near future.

Thomaston is approximately ten miles north of the city of Waterbury, Conn. Judson Darrow, Woodbury, Conn. is an information source for the Wigwam Gun Club and its facilities.

Photo made by John Eykelhoff.

JACK LACY

Jack Lacy died July 28th following a heart attack at his home in New Haven, Connecticut. He was 57 years old.

Jack, a long time employee at Winchester Repeating Arms Co., became nationally well known as a member of the little group of top-notch smallbore shooters which represented Winchester in the 1930's and helped make shooting history in that era.

Jack's greatest contribution to shooting was instructing juniors in firearms handling and rifle marksmanship. As leader and chief instructor in the Quinpiac Junior Rifle Club through nearly three decades he started countless boys and girls in the New Haven area on the right road in shooting.

During World War II he organized and was chief instructor of one of the pre-induction marksmanship schools of that period which served hundreds of young men prior to their entry into the armed services. Letters Jack received from some of those young men credited that training to saving their lives on the battlefields.

Jack was a true sportsman and a staunch friend—one of those we hate to lose.

PHT

MIRAGE

By Donald D. Barr

(Editor's note: The following is from an instructional pamphlet which Mr. Barr wrote for a series of seminars about shooting techniques within the membership of the Sycamore Hill Rifle Club, Cleveland, Ohio. Mr. Barr is an experienced long range shooter and has cooperated with Mr. Homer S. Powley in conducting "wind data" studies at New London, Ohio, and Camp Perry, Ohio.)

Mirage is a range term for the heat waves or air currents which shooters use to

determine the speed and direction of the wind. Although an experienced shot notes the motion of the trees, bushes, grass, or flags for information of the wind velocity, he depends mainly on the mirage. Not only is it the most reliable guide, but it can be seen drifting when everything else is motionless.

Mirage is best seen against a white background—top or bottom of the targets, top of the butts, or the white parts of the target's number board. If it is a hot and sunny day, there will be no difficulty seeing the mirage. If it is a dark cool day, it will take an excellent spotting scope to clarify the atmosphere so it can be seen.

Due to the great controversy among the "experts," and the shots that are truly experienced and also cannot agree, as to what visual effect mirage apparently causes when the shooter looks at the target, this discussion will be primarily concerned with a method for estimating wind speed from the apparent visual motion of any existing mirage.

To "read" mirage, the spotting scope should be focused for a point approximately two-thirds of the distance from the firing line to the targets. The greatest effect in the bullet's travel will occur in the final one-third of its flight to the target; therefore, we are primarily concerned with the conditions in that area.

Also, with the telescope focused at the approximate two-thirds range, we are able to read the cumulative effect of the wind that will exert a force of any significant magnitude on the bullet.

The observable mirage we see when we peer through the scope will have the appearance of clear moving water, and if there is no breeze, a plain "boiling" or straight up flow will be the predominant effect. If the wind comes from 12 to 6 o'clock, the boiling effect will be faster than usual, and if from 3 or 9 o'clock, the mirage has a flowing effect like a stream of water.

Any wind coming from an angle, depending upon its velocity, may combine with the boiling and give a diagonal drift to the boil or may cause an apparent horizontal flow across the field of view. The exact effect these lateral winds may have on the flight of your bullet can be predicted fairly closely by correctly reading the cumulative effect observed through your scope.

If the mirage is easily seen, the wind is actually slow. The flowing water will appear to move slowly across the target and have high and easily discernible peaks, according to some sources. Actually, we should be concerned mostly by the apparent speed of the whole body of mirage at the points we are watching. A fair guess at the speed of this "slow" mirage would be three to five miles per hour.

Mirage flowing much faster across the targets and number boards but still easily seen, probably has an average speed in the seven or eight mile per hour range. If it is barely visible, the speed of the wind in reality is fast, for wind dispels mirage. We can guess this speed to be from ten to twelve miles per hour when the faint watery lines appear as streaks across the discernible places.

Occasionally, mirage can be seen at higher wind velocities, but the "authorities" contend that mirage flattens out and disappears after the wind has reached a speed of fourteen to sixteen miles per hour.

Don't worry, for if you KNOW the zero on your rifle, you can miscalculate the wind almost three miles per hour and still get a hit in the 5-ring at 1000 yards.

Experience is truly the best teacher where mirage is concerned. Wind doping is the prime factor in determining the abil-

ity of a long range shooter or coach, all other things being equal.

RANDOM SHOTS

By Betty Summerall Duncan

It is not my intention to infringe upon the domain of tournament sponsors. The endless details connected with the operation of tournaments can be so time-consuming that tournament reports are not always submitted. Shooters receive little enough recognition for achievements which require infinitely more skill than the sports which make the headlines. My dual purpose here is to recognize the winners as well as to pass on to all of you the bits of shooting news which have come my way.

National Smallbore Champ, Vic Auer of Sherman Oaks, Calif., is on something of a good-will tour, spreading his friendly personality throughout the country. His initial summer victory was the Southwestern Smallbore Regional at Houston, Texas on June 16-17, which he won with a 3192 score. Oscar Morris, Hobbs, New Mexico, was second with 3189. Vic's 1595 metallic sight agg. win clinched his eligibility for the International Prone Team try-outs next spring. Teaming up with Sgt. Ed Caygle, USAF, for the 2-man team Dewar metallic, resulted in shattering the National Record with an 800-64X score, 4Xs over the former record. Winner of the Any Sight Agg. with a 1599 was Dick Hanson, now living in Ft. Worth.

From Texas Vic traveled to La Grande, Oregon, for the North Pacific Regional, July 7-8. One man can't win them all, and Vic was second this time to Alan Dapp, Corvallis, Ore., who had a 3189 to Vic's 3185. The Champ took the Any Sight Agg., however, and teamed up with Henry Benson, Salmon, Idaho, to win both team matches.

Auers' next stop was the East Central Smallbore Regional at Auburn, N. Y., July 14-15. He was defeated there by Larry Moore, who Creedmoored National Junior Champion Eric Sundstrom, Jr., both with 3189-232X. Vic again took the Any Sight Agg. with 1597 and the 2-man team match which he fired with young Sundstrom. Winner of the 100-yd. any sight match was petite Leigh Baxter from Miami Springs, Florida.

Back home again for a breather, "our boy" won the 50-yard metallic at the weekly match at the Los Angeles Rifle and Revolver Club with 400-32X on July 22. . . . At this writing, he is getting a new prescription for his contact lenses before flying to the Great Lakes Regional in Minneapolis July 28-29. . . . Whether or not Vic repeats as National Champion (he was second in 1960), he is certain to be a threat.

The Los Angeles Rifle and Revolver Club has already been heard from in other quarters this summer. Mrs. Elinor Bell, Santa Monica, Calif., twice National Smallbore Ladies' Champion, and her husband, Archie, created their own stampede at the Calgary Stampede in the Canadian province of Alberta, July 7-8. Not only did Elinor win the Grand Aggregate, with Archie in second spot, but her 1574 was the highest Any Sight Agg. ever fired in Canada on the I. S. U. targets.

Elinor was High Lady at the Idaho State matches June 30-July 1 at Twin Falls, Idaho, which tournament she won two years ago. Joe Specht, Fresno, Calif., was out in front with 3190-227X over Creed Page, Grand Junction, Colo., who was second with 3190-200X. Joe's wife, Marilyn, was close behind Elinor—3182-207X to 3181-190X.

News from the South Atlantic Smallbore Regional, fired at Knoxville, Tennessee

June 23-24, reveals that Larry Wilkins, who led the Ohio delegation into Dixie, did not succumb to the southern hospitality to the extent that he was deterred from "burning up the range" . . . For a bit of history on Larry he was one of the first of the spectacular junior shooters, and competed at Bisley in 1931 when just a youngster. My father recalls that he and John Adams were nosed out in the 2-man team Dewar by Larry Wilkins and Thurman Randle back at Camp Perry in 1932, both teams with 2 points down. . . . But, back to the present, it took a veteran like Larry to weather the rough conditions with only 6 points down in the Grand. Lt. Barry Trew, of Washington, Pa., now stationed at Ft. Benning, won the metallic sight agg. with 2 points down. . . . Friends around the country will be happy to hear that Ollie Lauderman was on the firing line in Knoxville, after two bouts in the hospital this spring, the last being a heart attack. . . . High Lady was Marjorie Hamlin, Ashville, N. C., who defeated National Woman's Champion Jan Fridell.

Jim Williams of Pasadena, Calif., who established 30 National Smallbore Records as a junior shooter, has recently graduated from Gunsmithing School in Denver. After shooting both the smallbore and high power nationals, representing the Colorado Nat'l Guard in the latter, he will be married in Ohio, and plans to set up shop in southern Calif.

17-year-old Gary Olson, Torrance, Calif., winner of four college scholarships, is rapidly making a name for himself in the shooting game. At the Smallbore Position Regional fired at Ft. Ord, Calif., June 24, Gary bettered the existing National Junior Record by 2 points with his 775 for 80 shots at 50 yds. in 4 positions. His 188 offhand was high over a field of predominantly senior shooters, and he was only 1 point behind the winner in the grand agg.

Gary is the newest member of our club composed of "Near-sighted Marksmen." Almost invariably when I persuade West Coast sports editors to do a feature on a shooter, the headlines proclaim, "Near-sighted marksman collects sharpshooter trophies." Vic Auer, Elinor Bell, and I are charter members. Perhaps some of you would like to increase our membership. There are no dues.

The report from Denver is that the Preliminary International Try-out competitors received a breezy welcome on July 14-15 with a 40 m.p.h. gale. Gary Anderson, Ft. Benning, achieved the distinction of having the only score above 1100 with 1103.

Ray Steele, of Denver, led the field of 60 competitors, over Oscar Morris, at the New Mexico State Smallbore Championship held at Cimarron July 21-22. No scores available.

Western Wildcat Champion Herb Holister added another to his string of rifle titles with the Northwestern Regional July 21-22 at Laurel, Montana. His winning score was an excellent 3196—the top regional score we've tuned in on so far. More details later.

A late flash from the Great Lakes Regional reveals that Vic Auer withstood some top-notch competition, defeating August Westergard—3191-248X to 3189-221X. Metallic Sight Agg. winner was former Nat'l Champ John Moschkau with 1595-97X, Auer in second spot—1594-125X and Gary Anderson, 3rd, also with a 1594. . . . Victor captured the Any Sight Agg.—1597-122X. Second place went to Bill Hankins, Cedar Rapids, Iowa, for his 1596-113X. . . . Two more national records toppled as Lee Sosteng fired a 400-38X in the Any Sight Dewar to claim new Junior and Women's Records. . . . Both 2-man team matches

STOP GUESSING AT HANDLOADS

Send your fired cartridge case, bullet with seating depth marked by a file and tell us barrel length, and we will calculate your load, muzzle velocity, pressure and trajectory, using the Powley Computer and Charts. \$10.00 pre-paid.
Or we have the Powley Computers for \$3.50.

HUTTON RIFLE RANCH . . .

1043 Greenleaf Canyon, Topanga, California
Official Range of GUNS & AMMO Magazine

went to the team of Miss Sosteng and Vic Auer.

Good shooting to all of you for the remainder of the summer. We enjoy giving credit where credit is due. If you are a winner and your name isn't mentioned, it is only because no one "cut me in" on the scoop.

TOURNAMENT CIRCUIT

MID-WESTERN SMALLBORE REGIONAL

Seventy competed in the Mid-Western Regional Smallbore Tournament, sponsored by the Libertyville Gun Club at Libertyville, Illinois, July 21-22. While scores in general were not exceptionally high, competition was keen throughout the two days and "Ollie" Lauderman from Dayton, Ohio, was the only one able to win more than one fired match—he won two.

For the iron sight shooting on Saturday the top aggregate guns were:
Douglas Knoop, Dayton, Ohio 1592-101
Rene Dognaux, Vincennes, Ind. 1591-94
Betty Ingleright, Buchanan, Mich. 1590-102
Oliver Lauderman, Dayton, Ohio 1588-96

Dognaux, Knoop and Lauderman held onto their leads through the any sight into the final match, Dognaux had 2790, matches on Sunday but Betty Ingleright had troubles and dropped behind. Going Knoop 2788 and Lauderman 2786. In the final match at 100 yards, Dognaux scored a 399 while Knoop and Lauderman each had a 398.

High for the any sight aggregate were:
Merrill A. Cherry 1598-112
Rene Dognaux 1598-108
Oliver Lauderman 1596-132
Robert Wempe 1596-124
Gene Stamm 1596-114

REGIONAL AGGREGATE TEN HIGH

Rene Dognaux	3189-202
Douglas Knoop	3186-208
Oliver Lauderman	3184-228
Robert Wempe	3180-219
John Moschkau	3180-213
Wm. L. Campbell	3179-187
Janet Friddell	3178-187
Harry Tevis	3178-182
Stan J. Patla	3178-180
Gene Stamm	3176-193

Match winners were: Iron Sights—50 meter, H. Reid Horner, Freeport, Ill. 398-29; 50 yds., Marshall Grosskopf, Marion, Wisc., 400-32; Dewar course, D. Knoop, 399-25 (2nd, Janet Friddell 399-25); 100 yds., Janet Friddell, Toledo, Ohio, 397-23.

Any Sights matches; 50 meters, Rene Dognaux 400-32; 50 yds., Oliver Lauderman 400-37; Dewar course, Lauderman 400-34; 100 yds., Robert Wempe, Glen Ellyn, Ill., 399-30.

Jesse Grigg, Chicago, who shot his first match at Camp Perry in 1919, collected a trophy before the tournament even started. The Blackhawk Rifle Club, in honor of Jesse's 45 years of competitive shooting,

COMING MATCHES

Albany, New York: Troop 36 (Vincen-tian Institute) B. S. A. Second Annual 1000 yard Registered Tournament; Karner Range, Albany County, New York, September 15 and 16, 1962. D. C. Reilly, 445 Western Avenue, Albany 3, New York.

Murrysville, Pa.: September 29 and 30; Pennsylvania State Free Rifle Championship (NRA Reg.), smallbore at 50 meters. Murrysville Rifle Club, W. R. Funk, R. D. 1, Box 2, Murrysville, Pa.

and numerous shooting articles, awarded him a well deserved trophy symbolic of all standards of the NRA and "THE SHOOTER."

Jesse ranked 27th in this tournament's grand aggregate with a score of 3151, after a tedious and still painful summer session of conditioning to overcome the effects from an arm fracture suffered last winter.

(Editor's note: Competitors at this tournament should have been pleased by the prompt delivery of official score bullets. The mimeographed official bulletin arrived at the PS office on July 25th, the third day after the tournament was finished.

CONNECTICUT SMALLBORE MATCH

A disappointing entry of eleven competed in the inaugural smallbore match on the fine new range of the Wigwam Gun Club at Thomaston, Conn., July 8th.

Lloyd Norton from Bridgeport won the 50 yd. any sight match with a 400-29x, the iron sight Dewar with 398-26x and the four match aggregate with 1590-94x. Carl Johnson from Hartford won the 100 yd. match on the 100 meter reduced target with 397-22x, was second, third and fourth in the other matches to take second in the aggregate with 1587-89x. Al MacEachron from Bridgeport won the any sight Dewar with 400-29x and Leman Atwood, shooting in class B, fired a 400-18x for the only other possible in that match.

NATIONAL VARMINT AND SPORTER RIFLE CHAMPIONSHIPS

The NBRSA's National Varmint and Sporter Championship matches at Wapwallopen, Pa., Aug. 10, 11 and 12 featured the finest shooting in these classes to date.

Harold Campau, Southgate, Michigan is the new Light Varmint Rifle Champion. Paul O. Gottschall, Salem, Ohio, led the pack by almost a country mile to become 1962 Heavy Varmint Rifle Champion.

M. H. "Mike" Walker, Mohawk, N. Y., successfully defended his Sporter class championship but he had to shoot better than in '61 to stay on the throne.

Warren Page, Field & Stream Shooting Editor, again had best over-all three class aggregate but he, too, had to "bear down" to hang onto his record.

A complete report of the matches, with pix, will be in the September issue.

P. H. T.

PRACTICAL SMALL HEAT TREATING FURNACES

By Edward M. Yard

(An Experimental Ballistics Associates Report)

The small gunsmith or the spare time gun tinkerer often wishes to heat treat parts. This will mean hardening small pieces. Usually an L. P. gas torch (propane gas bottle and burner tip), a Bernz-O-Matic torch, is the only equipment available. This article will attempt to explain how the use of such torches with some simple auxiliary equipment can handle these typical tasks. A very basic explanation of what goes on in the heat treatments will also be given.

L. P. torches have a fairly high flame temperature, about 2300 F, and are capable of heating small pieces to temperatures ample for hardening carbon steels. As the size of the piece increases, heat losses from its surface, when heated in the open, approach the total heat release of the torch, and a temperature limit is reached. At some size this will be below the proper quenching point for full hardness. Also, the bigger the work, the longer it will take to reach full temperature, and the time it takes to get to heat is important for best results.

When steel is heated in an open flame, the surface is oxidized or scaled. This represents a loss of surface metal, changing dimensions, and causing a roughening of the finish. This effect is dependent upon time as well as temperature. The longer it takes to heat a piece, the greater will be the oxidation loss, the rougher the surface. When times exceed a few minutes, the loss of carbon from the work surface may impair hardness and the wear and life of the part.

When using a gas torch flame to heat small parts for hardening, work piece size should be limited to those that may be brought to quenching temperature, about 1600 F, in two minutes to five minutes at most. When more time will be required, then some means to protect the work from the air should be provided, and some way found to get it hot faster. Otherwise the quality of the work will suffer markedly.

Fortunately such means are easily improvised by even the small work bench size shop, and will be found as effective as the elaborate furnaces of heat treating shops. Such little heaters as we talk about are, of course, limited to smaller small-arms parts and tools up to about the size of most rifle receivers (AND do not interpret this to be saying we suggest anyone heat treat a receiver!). We are talking about piece size for the simple furnaces to be described. What you may elect to treat must depend upon your knowledge of metals. We cannot, and do not try, to teach you metallurgy in one quick lesson (and for that matter don't know that much ourselves).

What is needed is an insulating enclosure to confine (prevent the loss of) heat, and to exclude air. The purpose is to keep the flame in contact with the work, and not let heat in the work escape to the surroundings. This is accomplished by making a small furnace out of insulating firebrick. Don't let this scare you. If you are even thinking about making gun parts, you are more than skillful enough to handle this one, and we include both easy to follow directions and pictures that show how simple it really is.

The insulating firebrick has been chosen as a material because it is an excellent heat barrier, and best of all, it can be worked with tools as simple as a penknife. For most gun parts, two bricks, hollowed out and butted together, with matching cavities,



A two brick cavity furnace opened to show how it is shaped and the relation of parts. The right hand brick is aligned with the torch tip as needed in use. This chamber has been heated often, yet no soot forms, work comes out clean. A file was used to cut vent, work entry, and burner channel. A pocket knife hollowed out the work chamber. I could be scraped clean with a teaspoon. 2300 F grade brick INSULATING FIREBRICK only should be used, as it is light weight and soft.

will form an ideal furnace chamber. Enclosures can be formed using up to ten bricks that one or two propane gas torches will heat. If a larger furnace is needed, larger burner equipment should be considered. However, rare odd jobs may be done using multiple torches and larger furnace enclosures along the lines to be described.

Gasoline blowtorches may be used instead of the propane bottle type. A larger burner hole in the brick will be needed. Also the average blowtorch will heat a somewhat larger furnace than the smaller tips usually supplied with home shop L. P. gas units. Either will do as a heat source, and are equally capable of firing up the small shop heat treating chamber.

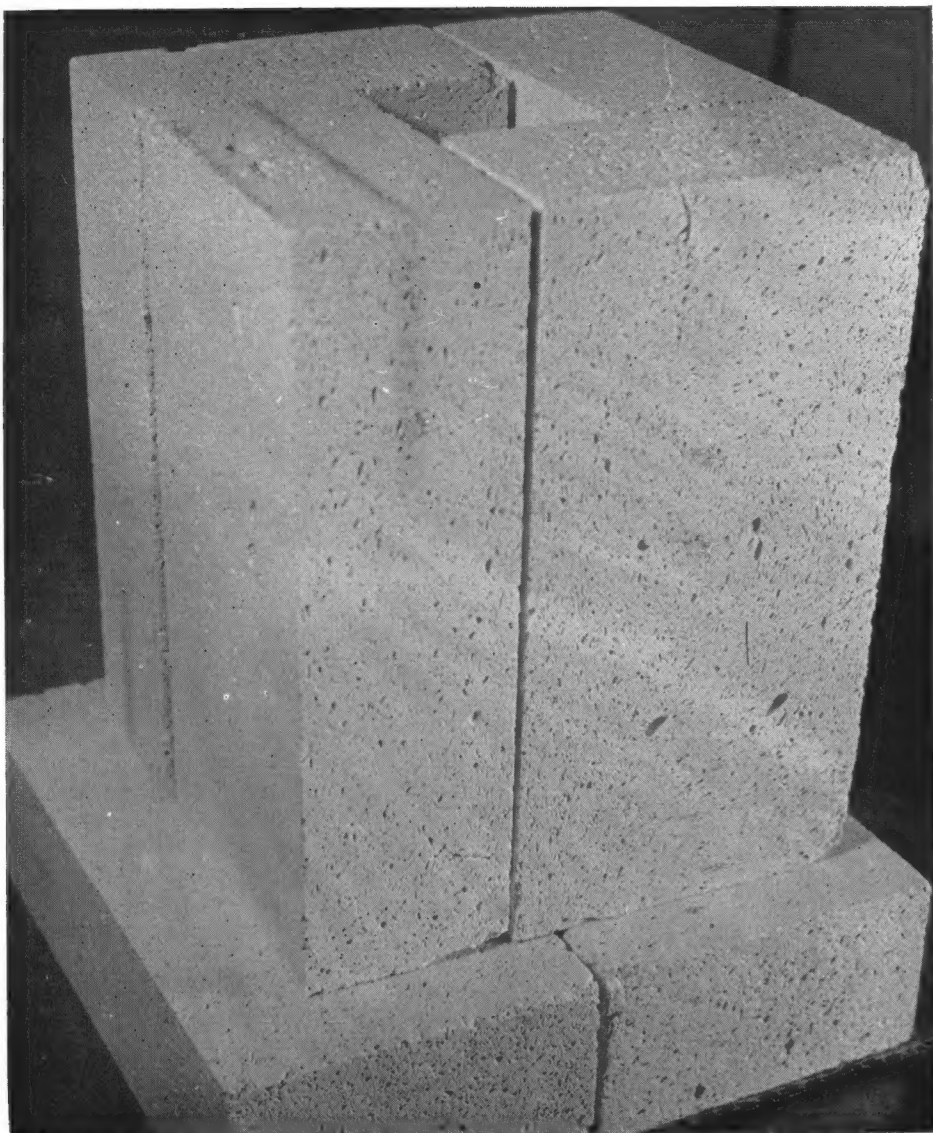
Lightweight, insulating, bricks have been on the market for some time, and are growing steadily in popularity. This is easy to understand, as they will withstand continuous exposure to flame and offer unprecedented heat retarding qualities. Two bricks may be hollowed out with a knife (see various sketches of suitable cavities) to accept an average chamber reamer, leaving less than 2" of brick thickness to the outside. The cavity may be heated at 2000 F in about 3 minutes. A cold reamer may then be inserted in the furnace and heated to 1600 F in another 3 minutes. The outside surface of the bricks will be so low that they are handled bare handed. This means that a furnace to heat most reamers

will measure only $4\frac{1}{2}$ " x 5" x 9", and consist of two of these bricks.

The cavities hollowed out in the bricks are simply to provide space for the part, or portion of the part, to be hardened and a clearance for the torch gasses or flame that will heat it. These chambers should be from about 2 to 3 times the diameter of the largest piece to be heated. An opening to let the flame in is required, and should be a bit larger than the burner tip to be used. A hole in the furnace top is needed to let the work enter, and withdraw for quenching. In addition two vent holes near the top of the work chamber will be needed to let flame gasses escape when the work piece plugs the entry hole on top. These features are shown on the figure sketches.

We will not attempt to educate you in the heat treating of steel in any event, but would like to make a few suggestions about how to use these little furnaces in hardening parts. Steels that you are likely to handle, and those that can be treated without some training in heat treating arts or metallurgy, are carbon steels. This means that carbon is the major alloying element. It accounts for the hardenability of the metal. A required minimum amount of carbon is needed to make steel harden by heat treatments. Also the form that the carbon has in the steel determines how hard it will be.

In over simplified terms, steel that has cooled very slowly from temperatures above 1400 F will have the carbon collected in



Six bricks have been assembled to show how larger chambers may be formed. This one gives a 2½ inch square by 9 inch deep work space. Two more bricks would allow a 5 inch square by 9 inch deep furnace chamber. An extra brick must be placed partly over the open top to prevent heat loss when it is in use. Burner channels should be cut to suit. Finishing nails may be used as in doweiled wood construction to hold bricks together and avoid leaks. Nails may be pushed into place with your fingers. Read text and directions.

islands surrounded by pure iron. Pure iron is soft and will determine the character of the metal, the islands of hard iron carbide (in which form the carbon exists in steel) are isolated and ineffective. One might visualize this as some marbles in a large cake of butter. The slow cooling of the steel allowed these islands of iron carbides to collect and separate from the mass of iron.

To achieve hardness it is necessary to disperse the carbon in the form of iron carbides throughout the mass of the steel. The particular form of this dispersion will determine the hardness (strength) of the metal. Iron carbide is as hard and brittle as glass, and very strong. If spread through the steel like fiber glass in plastics, it reinforces the iron and gives it properties of hardness and strength. The whole purpose of heat treating steel, often referred to as hardening or tempering it (not always entirely accurately), is to deploy the carbon in the best form for the use intended. This can be quite a complicated business, and we will touch upon basics only.

We could buy steel as hard as we wished, but then it would be difficult to work it or form it to suit our need. Thus we buy it soft or in mild temper. In this form it is worked to suit with reasonable

ease. Its carbon is rather roughly dispersed. To get the hardness we would like, its structure must be reformed. This can be done by heating and cooling in the proper manner.

Whenever hardening steels (irons with appreciable carbon contents, as .7% and above) are heated above 1400 F, the carbon dissolves in the iron. It is then uniformly dispersed throughout the mass, and may be likened to sugar dissolved in a cup of coffee, every drop being equally sweet. Before proceeding, we must say that to harden steel, it must be heated above 1500 F, in practice, to produce practical results. Once, though, the carbon is so dissolved, the manner of the cooling determines the properties that will result.

When the steel cools, after heating as described, the carbon is no longer soluble in the iron, and must revert at once to iron carbides dispersed in the mass. These carbides can move about in the iron when it is near to the temperature of solution (even though the iron is solid, technically), but at lower temperatures it cannot move at all. So, if cooled slowly, it stays a long while in a state where the carbon can migrate, and collects as islands in the soft iron.

If cooled quickly, in a second, quenched in a pail of water, the carbon reverts to

carbides that remain trapped wherever they were, and the steel is hard and brittle. In the making of tools, dies, and the like, this is the usual procedure. The steel is made as hard as possible, first, then its temper is drawn back. Our main purpose in this article is to show how to achieve this initial tool hardness in steels, and this is done in two steps. First get the steel hot enough to dissolve its carbon, then cool it quickly enough to trap this carbon as iron carbides in suitable form. The first step, the heating is our theme. The rest of this is explanation of the realm within which we must work.

The reason for the furnace, and the reason for conserving heat should now be apparent. A torch presents a small flame area to any work piece the size of a reamer or other tool. Unless confined in a heat barrier such as the furnace shells we have described, it cannot uniformly heat a piece of steel to the 1550 F or higher temperature necessary if the carbon is to be quickly dissolved and the piece properly quenched. Carbon will combine with the oxygen in air, and thus burn out of the steel. When gone, hardness cannot be achieved. We have already pointed out that speed in heating will minimize this effect. These simple heating chambers are a basic requirement for proper heat treating of steels. They are also entirely adequate for this type of work.

Various assemblages of bricks and carved cavities are shown, and others may be adapted for particular work. With one torch about 45 cubic inches may be heated, and up to 180 cubic inches with two. The larger the chamber and the heavier the work, the longer will be the preheat and heating times. It matters little, except in convenience and economy, how long it takes to preheat the furnace, but the work should be brought to temperature, 1550 F or higher, as quickly as possible. If more than ten minutes is required, oxidation and loss of carbon may cause you trouble.

You should arrange the work area and the furnace so that the heated piece may quickly be withdrawn from the heating chamber and plunged into the quench. The cooling must be done quickly to trap those carbides and achieve a hardened state.

Armstrong Cork, Babcock & Wilcox, J. P. Green, Johns Manville, and others make insulating firebrick. The K-23 grade should be chosen, rated good to 2300 F. This will combine optimum heat conservation with adequate peak temperature rating. Your Yellow Pages should lead you to a supplier.

DIRECTIONS For Making A FURNACE

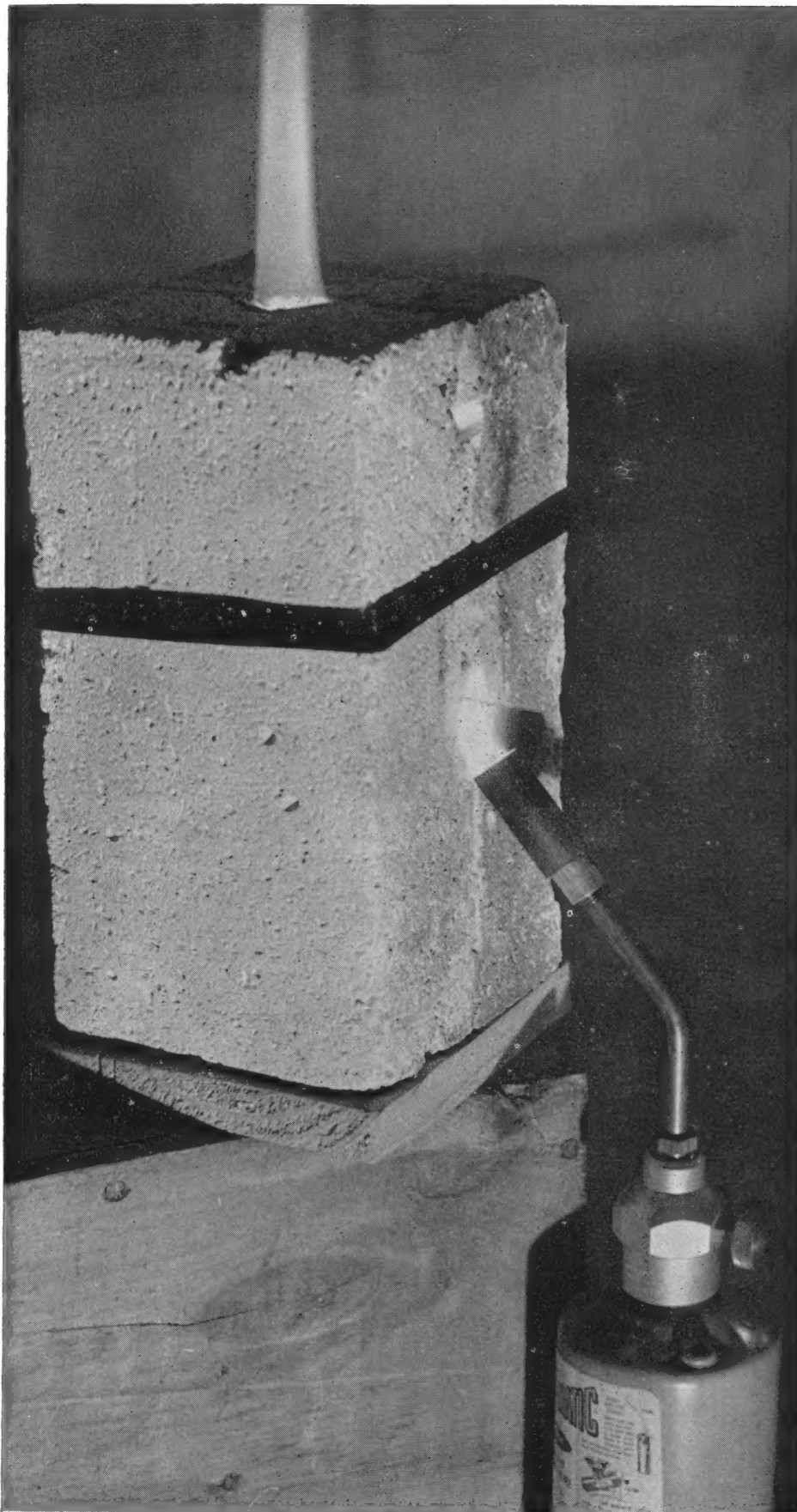
The text of this story, and the illustrations should give you pretty much the idea of how these useful and efficient heat treating furnaces are constructed. The following bits of experience, trade knowledge and direction is offered to help you along.

These bricks may be cut and shaped most easily using an old paring knife, a teaspoon, and a worn out hack saw blade (they are easily sawed). Remember that they are brittle, and cannot be dropped or struck without danger of breaking. Use the above tools to shape as required. No wall should be less than 1" (one inch) thick.

The brick may be subjected to full temperature immediately, requiring no warm up before this. However all joints must be tightly butted, or heat will escape and air leak into them to spoil the work.

Hold the brick together with a band of thin steel strapping salvaged from a shipping crate. They may be tied together with twine if it is kept away from vents or

(Continued on Page Six)



The furnace is at heat treating temperature and under fire. The chamber will appear a light yellow color, almost white hot, in two to three minutes. The work should be in the same length of time. Use a tip larger than that shown for larger work to keep heating time short. Note steel band holding bricks together and stop leaks, wood box to hold it at right height for burner, and that burner must align well with burner channel, but does NOT enter it. Flame should come out top work entry as shown here, and shows that the furnace is filled with flame. Air is flushed out by the hot gasses and oxidation of the work is reduced.

Practical Small Heat Treating Furnaces

(Continued from Page Five)

openings, as the bricks remain cool when heating is confined to 15 or 20 minutes total. If twine or wire is used protect the corners with cardboard or copper sheet guards.

Larger assemblies of many brick can be fastened with finishing nails pushed in with the fingers, similar to dowelled construction with wood. They may be cemented with various air setting cements sold for the purpose (it will be a problem to get small amounts).

Remember that every furnace needs to be vented by an area equal to at least the burner hole area, usually placed near the top, often around the work. Tie a strong steel wire to the part so that can be pulled out quickly for immediate quenching.

THE SCOPE BLOCK

By Jesse M. Grigg

DID you ever take one click per shot for maybe four times while the impact point did not move off the spot, then find the fifth shot in the 9-ring on the other side? Or, maybe you got a double at 12 o'clock on the record, next a pinwheel on the sighter, and the next one for record an 8 at 6 o'clock. Or yet again, did your rifle ever start grouping at two places just after you dropped down to shoot for record?

All this and more has happened to me; and when the fault was finally run to earth, the trouble was generally diagnosed as either a misfit in the dovetail slot of the sight, or more likely a burred locking screw. Either the surfaces of the dovetail slot did not contact the scope block in the required zones, or else the locking screw only seemed to be tight, and another hard twist of the driver did not improve matters in the least.

In Fig. 1 the place where the hub of the locking screw should bear, and the particular zones where the surfaces of the dovetail slot and the block should be in contact are denoted by the heavier lines.

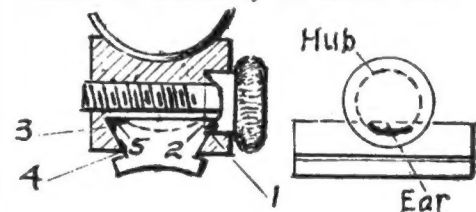
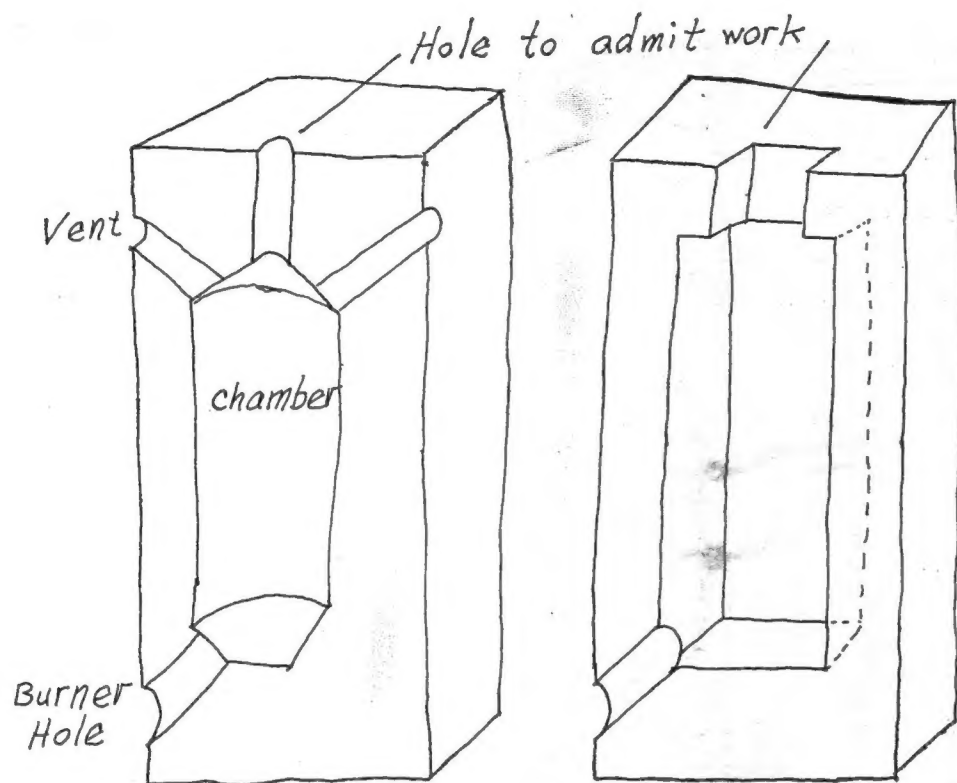


FIG. 1

First of all note that point 1, where the flange of the hub bears, needs to be somewhat below the level 2-5 of the top of the block in order to complete the 3-point fastening which is needed for rigidity. Note also that tightening of the locking screw pulls the dovetail slot to the right. As the surface 3-4 is slanted in this direction, the dovetail slot moves downward while it moves to the right. Thus the surfaces vitally bear on both the top of the block at 2, and also on the side at 3. At the same time there must be a bearing at some point, say 4, whose level is below that of 1, in order to complete the 3-point support.

To insure that the bearings are at these vital places there should be no significant pressure contact on the top of the block between 2 and 5; to obtain this condition the section of some scope blocks curves inward as is indicated by the dotted curved line. Between 3 and 4 the surfaces should likewise be free of each other. If they do contact here, and the pressure predominates, the result is a 2-point support, and failure of the rifle to hold a zero. In times past, having suspected the existence of a ridge in



Sketched above are two basic furnace cavities for the two brick assemblies most often needed. The round chamber is preferred as it weakens the brick less and swirls the gasses more, but doesn't hold as much. A mirror mating piece needed for each. Work hole for square chamber also serves as vent after work is within furnace. Angle burner hole to suit torch used.

this region, I have passed the scope block over the corner of a grinding wheel to make sure of proper clearance.

By far the fault of most frequent occurrence is failure of the flange of the locking screw to press firmly against the scope block ear, even though the screw feels tight to the driver. Fundamentally, the reason is that the ear of the scope block is harder than the hub of the locking screw. Being harder, its sharp edge cuts like a lathe tool. In time a part of the rim of the hub is cut away, the cut ending in an abrupt shoulder which precludes further turning of the screw in tightening.

Notwithstanding the abrupt shoulder, the sight often gives satisfactory service if this particular screw is used with only one particular block. But let this sight and screw be mounted on a different block, then the shooter may be in for some exasperating experiences. It is better to have a separate screw for each block on which the sight is to be mounted.

In my experience the troubles which are due to the block being harder than the hub flange are encountered principally in metallic sight shooting. To dull the cutting edges at each end of the ear helps to prevent a repetition of the fault, but this calls for a stone with a sharp V-edge. If the abrupt shoulder is already there it should be smoothed down; then with a little oil and emery on the ear the locking screw should be worked in and out to extend the area of contact. This helps even though the flange is merely worn, and it is a smart thing to do if the screw is to be used with a different block.

In event that the flange is harder than the block, as is likely to be the case with scope mounts, then the flange gradually wears an annular groove in the ear instead of taking the wear itself. This is good; for the screw comes tight gradually, making for security without the need of excessive torque to gain it. However, if the screw is pulled needlessly tight the hardened flange

may become chipped, the gap amounting to a shoulder that interferes with tightening.

An occasional scope block is too far on the side of softness, with result that the ear is upset by the hard flange, and stands above the mean level of the top. When this has occurred the bulge should be leveled with a file, which will easily cut it because metal soft enough to upset is soft enough to file.

As to relative hardness of hubs and blocks, a file skated freely over four Unertl scope screws. Over six among nine scope blocks it did the same; the other three it would cut. Of four screws suitable as to size for Olympic front sights the file would cut two with difficulty. With the other two the file test was inconclusive.

I believe that a hub which the file will not cut and a block which it will cut with a little difficulty is the best combination. This combination has proved satisfactory for me in scope shooting, while the reverse combination, which I have usually had in metallic sight shooting, has caused trouble at infrequent intervals.

BRITISH MATCH RIFLE SHOOTING

By B. J. King, M.D.

British Match Rifle shooting is confined to two calibres—22 Long Rifle rim fire, and .303 MkVII centre fire. This article will concern itself only with the centre-fire match rifle shooting.

Centrefire match rifle shooting as practiced in Great Britain today is restricted for all practical purposes to the .303 MkVII cartridge. This cartridge has been the 'issue' cartridge of the Government armed forces since the adoption of the .303 Martini-Henry rifle in the 1880's. In the last few years the .303 has been gradually replaced in active service by the 7.62 NATO cartridge which is used in the FN service rifle. The rifles available for match shooting in Great Britain are restricted to relatively few patterns. The Service rifle has always been available to both rifle club and

individual users, and this type of rifle is certainly the one most commonly used today. Much less common, but probably of more interest, is the prone and back position match rifle which has been developed over the last 100 years.

Promotion of match rifle shooting has depended largely upon the British National Rifle Association, which was founded in 1860. The policy of the NRA has always been to encourage the use of the currently available military arms for target practice, so that over the last 100 years, the match rifle has included the .577 Snider conversion of the Enfield muzzle loader; the .450 Martini-Henry breechloader; the .303 Martini-Henry, and finally the various patterns of Enfield rifle employing the Enfield and Metford types of Rifling, with the Lee action.

Coincident with the use of the Service rifle has been the use of the long range Match Rifle, which is almost a specialty of Bisley. The history of the various types of rifles used, and their various modifications and developments, will be discussed in more detail.

Long Range Match Rifles: The policy of the NRA to encourage use of the military rifle in long range matches has not always met with success. In the early 1860's during the first few years of the NRA's existence the military rifle was the muzzle-loading Enfield .577. While perhaps suitable for military use, this rifle was never accurate, and it was left to private manufacturers, among them Mr. Joseph Whitworth, to design and manufacture rifles of better accuracy. For several years the official NRA Match Rifle was in fact the Whitworth, and while this also was a muzzle-loader, it was for many years the favourite of long range shooters in Great Britain. This rifle could be used either prone, or in the back position, the latter being favoured especially by American target shooters of this era. Whitworth was not alone in the field of development of long range rifles; Henry of Edinburgh, and Rigby of Dublin, were close competitors, especially with the respective National teams of Scotland and Ireland. Rigby developed his rifles so well in fact that the Irish team in 1872 was able to defeat England in the Elcho Shield match at Wimbledon with a record score. This prompted the Irish team to challenge the American NRA to a match in New York the following year. The match, which was subsequently arranged by the Amateur Rifle Club, and whose details do not concern us here, was won by the American team by a narrow margin.

Two points about the match are worth noting. First, the American team was using breech-loading rifles; second, the entire team shot from the back position, while only half the Irish team used this style of shooting. As if to emphasize American superiority, the American team in a return match at Dollymount in Ireland the following year, not only beat the Irish team again (this time by a handsome margin) but also set a new record average score for the range.

The effect of the two American wins was to influence the design of the British long range rifles. The continued use of black powder (smokeless had not been invented yet) required the use of long barrels for adequate combustion of the heavy powder charges used to drive the heavy .450 calibre bullets to the target 1000 yards away. The length of the barrel was therefore set by the type of propellant available; this again was to influence subsequent barrel design for many years.

The success of the American shooters with the back position led many of the

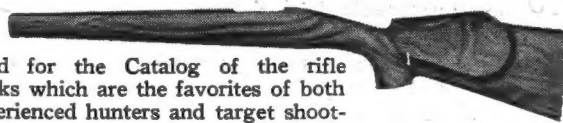
(Continued on Page Eight)

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Match Rifle Sights: All the early types of sights were metallic; some were V sights, with various types of bead foresight. Eventually the orthoptic sight (aperture rear sights with bead or aperture foresight

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British Match Rifle Shooting

(Continued from Page Seven)

British long range shooters to adopt this style of shooting. The position necessitated positioning the rear sight on the heel of the butt, so that from the 1870's many match rifles were built with rear sights which might be used optionally on the tang, or the heel of the butt. Many of the rifles had adjustments on the sights only for elevation; however, it eventually became the practice to modify the foresight so that for windage could be made. Hence, by the late 1870's the long range match rifle was characterized by a long barrel, wind gauge front sight, and elevating rear sight which could be attached optionally to the tang or heel of the butt.

Coincident with the developments mentioned above, the muzzle-loader gave way to the breechloader. This was forced upon the British shooters by the marked superiority of the American breechloader, which in international competitions and in individual use at Wimbledon, had shown clearly that its inherent accuracy far exceeded that of the muzzle-loader. As a hangover from the muzzle-loader days, the early breechloader was of 'large' bore; the most frequent calibres being .450 to .500. The advent of the breechloader saw the invention of many different types of action. These were mostly single shot actions, and based on a falling or hinged block design. Several American designs of this period include the Remington rolling block; the Sharps; Springfield trapdoor; Ballard and Farrow. The British designs of this period were the Field, Henry, Martini (adapted from the Swiss modification of the Peabody), the Soper, Swinburn, and Westley Richards single shots, and the Snider action adopted for the Government rifles.

Apart from refinements in the sights, the use of better ammunition (with hand-loading) and general improvements in manufacture, the British long range rifle altered little in external characteristics between the late 1870's and the early 1890's.

While Great Britain concentrated largely upon development of single shot actions (eg Snider, Martini), other countries were developing magazine rifles. These were either bolt action rifles (eg Mauser,



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A British long range rifleman shooting from the back position in a 1200 yard match. Note the head-piece connected to the strap around leg, for supporting the head while aiming. The sights are the telescopic type described by Dr. King. The rifle has the Dutch Mannlicher bolt action. Note the slim, lightweight barrels; not what are desired but what are required by the match rules.

Mannlicher) or lever operated such as the Winchester. These were characterized by the development of small calibre bullets, this being made possible by the invention of smokeless propellant.

The smokeless propellants allowed for greater muzzle velocity, jacketed bullets, and a reduction in barrel length, as the propellant could now burn in much less barrel than was required by black powder. One particular rifle was to influence British Match Rifle design more than others. This was the turn bolt Mannlicher produced in several models between 1891 and 1895, mostly for the Dutch and Roumanian armies. The Dutch rifle (ultimately designated Model 1895 Mannlicher) was chambered for a 6.553R cartridge. This had a high ballistic coefficient, was extremely accurate at long ranges, and was in effect a necked down .303 Mk1 which was being used in the .303 Martini-Henry rifle. The headspace and rim diameter of the Dutch cartridge are for all practical purposes identical with the British .303. However, the reduction in calibre, with higher sectional density, made the 6.5mm a much superior cartridge. It was not surprising therefore that this rifle was welcomed by many British long range shooters as being suitable for their long range matches. The issue barrel was 31 inches long, not as long as many of the match rifles then in use; however, the rifle could be used either 'as issued' or a longer barrel fitted, to conform with the pattern established many years before by the black powder rifles.

The combination of 6.5mm cartridge,

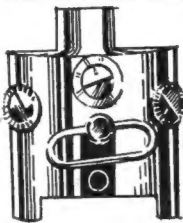
with spirit level attachment, came to be the favourite combination. While telescopes were used for spotting purposes, their size and weight presented engineering problems when they were mounted on match rifles. The trajectory of the early breechloading rifles was so great that the telescope had to be side mounted, the object lens being below the level of the muzzle. The invention in the 1880's of the Common sight was a great improvement. This was a simple Galileian telescope; a large convex (magnifying) lens was the foresight, and a small concave (reducing) lens the rear sight. By a suitable combination of lenses, a simple telescope of 6-8 power magnification could be constructed. It had the advantage of a long sight base, lightness (and less damage from recoil) and relative cheapness. Disadvantages were the very small field of view, low magnification, and the formation of an erect but virtual image. The "virtual" image meant that a crosswire could not be made to coincide with the image, so that while a fine crosswire could be inscribed on the front lens as an aiming mark, it could never be in parallax with the target image. The drawbacks were exceeded by the advantages however, and it soon became customary to install the Common telescopic sight on all back position match rifles. These sights were made in the heyday of match rifle shooting, and few sights have been made since the early 1900's.

The back position telescopic sight was of course used with the 6.5mm Mannlicher rifle, and this combination for many years won the major long range matches in Great

Britain. Subsequent changes in NRA rules required the use of the .303 MkVII cartridge. Since this only necessitated the rebarreling of the 6.5mm Mannlichers, the British long range rifle became in effect a back position .303 Mannlicher.

Further Developments: So much for the development of the long range match rifle. The further development has been greatly hampered by several factors. The first is the restriction to either .303 calibre or military rifles as issued but with telescope sights attached. The continuing use of the long obsolete (ballistically) .303 cartridge has resulted in little improvement in long range shooting. Secondly, the continuing use of the back position has resulted in the

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DUAL RANGE SIGHT



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Another British rifleman shooting to 1200 yards from the back position. Targets show dimly in the distance. The front sight is the front of the telescopic type described by Dr. King.

almost complete neglect of target telescopes such as are used in the United States. NRA rules restrict the weight of the match barrels to 3¼ pounds; and this presents problems in mounting telescope bases properly. The almost complete lack of restocking facilities for these rifles has led to the continuing use of modified military stocks, so that technically the match rifle has advanced little since the 1900 era. Trigger pulls are still restricted to 3 lbs., so that double set triggers are excluded, while the trigger modifications available in this country (eg Canjar, Timney) are unheard of. The result is that the rifles per se are no more than rebarreled Mannlicher rifles of 1895 vintage, with poor quality optical sights probably made around 1900, chambered for a ballistically inferior cartridge, and fitted with stocks more suited to military than target shooting. The triggers are usually 'as issued' although adjusted for crisp release.

The last factor which has restricted match rifle shooting, quite apart from the calibre restriction, is the total lack of handloading. While some few individuals can and do handload in Great Britain, equipment is almost entirely of American origin, is costly (because of high import duty) and is in any case not adapted to Berdan primers. Powders for reloading rifle shells are for all practical purposes unobtainable, while the persisting use of Government factoris of mercuric and corrosive primers does nothing to help the brass situation. In any case, even were handloading supplies and technical data available, NRA rules preclude the use of handloads; only 'issue' ammunition being allowed.

All ammunition for the long range

matches at Bisley is supplied free of charge by Eley Kynoch division of Imperial Chemical Industries. This company loads each year one batch of Match ammunition for the long range matches. Marked KSL (Kynoch Streamline) on the base of each cartridge, it is the **only** centre-fire ammunition made in Great Britain to match specifications. It is the **only** centre-fire cartridge loaded with a boat-tail bullet. Its accuracy is about 2 minutes of angle, although some batches are much better than this. This is the **only** ammunition which may be used in the Bisley long range matches.

The complete lack of control over quality of ammunition, weight of barrel, and calibre of cartridge, leaves the long range shooter little to modify in an effort to improve his shooting. It is little wonder therefore that long range shooting with the match rifle is slowly dying out, only a small core of devotees keeping the sport in existence. The restrictions placed upon the long range shooter preclude any experiments with barrels, calibers or handloading there is thus a real ignorance of current developments in ballistics and firearms, and an apathy which has to be seen to be realized. This does **not** mean the British shooters cannot put up good scores. The Bisley 5 ring is the same size as that at Camp Perry, and the ranges are longer (to 1200 yards). Scores are just as good as those made at Perry, although one wonders what the addition of some .300 magnums to the British repertoire might do to these scores. Technically speaking then, the British long range shooter is severely handicapped by his equipment, and is shooting with rifles of 1900 vintage.

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LETTERS

"KINK" FOR LIGHT LOADS:

Dear Mr. Teachout:

I have just read your comments concerning position of powder charge in the case in the June issue of Precision Shooting. I have done some experimenting along this line and would like to pass along my experience.

Basically, I just followed the expert advice of Col. E. H. Harrison in his article "Refinements in Cast Bullets," page 109 of the NRA Illustrated Reloading Handbook. His experiments indicated that some type of overpowder wad in certain situations could improve groups. Applying his suggestions as to materials to be used I have had drastic improvements in accuracy of loads that had

(Continued on Page Fifteen)

National Bench Rest Shooters Association, Inc.

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PRESIDENT'S CORNER

As you read this it will be nearing time to journey to Tulsa, Oklahoma and our National Matches. For the Directors it also means our annual meetings. Your Directors have many things to consider, study and act upon. Every one will not be pleased with the results but it is hoped that the majority will be in accord with what is done, for I assure you that your Directors have acted in the best interests of the NBRSA and will do so again this year.

Many of the problems are most difficult to solve for they may affect different sections of the NBRSA in different ways, or a certain condition may be very popular in one area but not at all popular in any of the other areas. It will be most helpful if the members would contact their regional director and discuss their ideas with him before this meeting. It is the only way he will know what his people would like to have in the future. If he does not obtain the things you request, do not criticize him for he has only one vote and there are nine votes at a board meeting. Everything is being done to give the membership the best possible shooting program. Your directors and a good number of members sacrifice time from their families, leisure and employment working for a better NBRSA. Won't you as a member lend a helping hand to make this a bigger success?

Until September,

Bob Hart

NOTICE OF ANNUAL MEETING OF BOARD OF DIRECTORS NBRSA

The Board of Directors will meet at Tulsa, Oklahoma, September 26-27-28-29, during the National Championship Matches. Purpose of the meetings is to act upon items placed on the agenda by the directors and president; the election of officers; the placing of National Matches.

Robert W. Hart, President

1962 BENCH REST MATCHES EASTERN REGION

UNRESTRICTED RIFLES

Augusta, Ohio: September 15-16 Reed's Run Rifle Range, P. O. Box 66, Augusta, Ohio.

Southboro, Mass.: October 14. Southboro Rod & Gun Club, J. W. Baldwin, P. O. Box 402, Westboro, Mass.

Plainfield, N. H.: Sept. 16; Plainfield Rifle Club, Leslie Stone, Sec'y, Plainfield, N. H.

Johnstown, N. Y.: September 1-2; Eastern Region Championship. Pine Tree Rifle Club, Edward J. Sweeney, 501 N. Market St., Johnstown, N. Y.

VARMINT & SPORTER RIFLES

Dryden, N. Y.: September 23, Dryden Fish & Game Club, Edward Shilen, Dryden, N. Y.

SOUTHWEST REGION

Yreka, Calif.: Sept. 1-2 (West Coast Championship). For Unrestricted Rifle, open and limited divisions, and both Varmint Classes. Yreka Rifle Club, contact Ray E. Jones, 508 Knapp St., Yreka, Calif.

Fresno, Calif.: Oct. 20-21 (Regional Championship); Fresno Rifle Club, Mrs. Henry C. Wright, Sec'y, 4663 East Olive, Fresno 2, Calif.

MID-CONTINENT REGION

Tulsa, Oklahoma: September 26, 27, 28 and 29 NATIONAL CHAMPIONSHIP, UNRESTRICTED RIFLES, OPEN AND LIMITED R. G. Berry, Sec'y, Pawnee, Oklahoma.

Hot Springs, Arkansas: October 14 (all matches for all classes). Hot Springs Gun Club, 101 Entrance St., Hot Springs, Arkansas.

Kansas City, Kansas: Unrestricted rifle only—October 20 (night matches). Mill Creek Rifle Club, L. F. Carden, Sec'y, 2211 North 44th St., Kansas City 4, Kansas.

Wichita, Kansas: September 2 (day—unrestricted rifle), October 6 (night—varmint and sporter). Wichita Bench Rest Rifle Club, Capt. Rick Hornbeck, 1640 Windsor, Wichita 18, Kansas.

MISSISSIPPI VALLEY REGION

St. Louis, Missouri: September 9 (heavy and light varmint), Bench Rest Rifle Club of St. Louis, Arthur M. Freund, Sec'y, 1038 Hornsby Avenue, St. Louis 15, Missouri.

NORTH-CENTRAL REGION

Iowa Falls, Iowa: September 16 (sporter & varmint). Iowa Falls Rifle, Pistol & Trapshooting Club, Inc., Maurice J. Stiner, Sec'y-Treas., Iowa Falls, Iowa.

Custer, South Dakota: September 9 (unrestricted shoot). For unrestricted bench rifles, heavy varmint and sporter classes. Black Hills Bench Rest Shooters Ass'n, Reg. McGiffin, President, 845 Rena Place, Rapid City, South Dakota.

"SO LONG SAM, WE'LL MISS YOU"

By Ed McNally

I arrived early at Lewistown (Pa.) for their July 7th and 8th shoot in high spirits and anticipation of seeing the many old friends I hadn't seen in some time. The high spirits were of short duration as I learned within a few moments of arrival that Sam Rothrock had passed away in the late Spring.

Sam was one of those rare people who automatically brought cheer and smiles wherever he was. It was contagious and to know him was to like him.

I first met Sam at one of the earliest Johnstown shoots. Clyde Hart and I were loading on a bench near the old 100 yard firing line and across from us was a happy faced little fellow with a very noticeable and delightful Pennsylvania Dutch accent. He was busy as a beaver but in the middle of his activities he burst out into a laugh that could be heard a city block and announced "By, yiminy, I godt dos brimers in, hop side down." That was Sam. He could and would laugh where others might cuss.

A couple of years later while coming back from the firing line at DuBois, I passed Sam and asked him how he was doing. Sam said, "I godt a bretty gude group but by jiminy, efry time I schoot de smoke comes back in my yeyes." I looked at his loading block and every primer in sighters and record cases had pierced primers. We went over to his loading bench to investigate. Sam had come to the shoot with Alex Hoyer and as usual, Alex had the back of his trunk loaded with every conceivable kind of powder ever produced. Sam had just reached in and taken the first can available and had been loading with Pistol powder. It's a miracle we didn't lose Sam that day.

Last summer, Dutch Aumiller and Sam went to a Reed's Run shoot. Dutch entered the money class but Sam shot for record only. They got an awful shellacking. On the way home, neither one said a word for the first forty miles, then Dutch broke the silence with "Man, didn't those rests pour it on us." Sam just looked at Dutch out of the corner of his eye and said "Dey shure dit, but py jiminy, I didnt pay em to do it." There was no more conversation for many miles.

Sam wasn't just a funny man. Sam was a real person and a good friend. Sam was the kind of person that makes this world a cheerful place to be. If you have formed the opinion that I liked Sam, you are absolutely correct. I not only liked him but so did everybody who knew him and so I say, "So long Sam, we'll miss you."

BENCHREST QUESTIONNAIRE STATISTICS

A GENERAL QUESTIONNAIRE FOR SHOOTERS regarding bench rest shooting interests was published as a separate sheet in March 1962 Precision Shooting. Following are the statistics compiled by A. H. Angerman from the 140 questionnaires which were sent to him. The statistics, by number and percentage, are in the order of the questions in the questionnaire.

No. 1—Are you a member of NBRSA?

Yes	98	70%
No	42	30%
	140	100%

No. 2—Were you once a member?

Yes	7	5.0%
No	19	13.5%
No answer	114	81.5%
	140	100.0%

No. 3—If once a member, what years?

The seven "yes" replies above reported 1955-1956—1952 to 1956-1952 to 1953—1953 to 1955—1958—1950 to 1960.

No. 4—Would you care for more information about joining its activities, etc?

Yes	43	31%
No	32	23%
No answer	65	46%
	140	100%

No. 5—Is your main interest experimental, general, competitive?

Experimental	74	34%
General	64	29%
Competitive	79	36%
No answer	3	1%
	220	100%

(Note: multiple answers account for the 220 number.)

No. 6—Is a bench rest youth participation program feasible in your area?

Yes	40	29%
No	73	52%
No answer	27	19%
	140	100%

No. 7—There are currently five classes of rifles used, please indicate the order of your interest: viz. 1, 2, 3, etc.

Order of interest

	1	2	3	4	5
Open class	24	7	8	9	43
Limited class	21	17	7	39	14
Heavy Varmint	40	42	38	3	1
Light Varmint	20	44	30	14	6
Sport Rifle	27	20	33	21	11
No answers	8	10	24	54	65
	140	140	140	140	140

Heavy guns	45	24	15	48	57
Varmint & Sporter	87	106	101	38	18
No Answers	8	10	24	54	65
	140	140	140	140	140

No. 8—Do you favor the following?

A) A change in name designation?		
Yes	24	17%
No	74	53%
No answer	42	30%
	140	100%

Regrouping (of classes)?

Yes	17	12%
No	58	41%
No answer	65	47%
	140	100%

Additional Limitations?

Yes	36	26%
No	52	37%
No answer	52	37%
	140	100%

B) Shooting for score as well as group in the Varmint and Sporter classes, with second place award to the highest scorer?

Yes	88	63%
No	44	31%
No answer	8	6%
	140	100%

C) Separate statistics, comparative standing of competitors and proportional distribution of awards for the heavy class rifles in all large NBRSA sponsored matches?

Yes	86	62%
No	17	12%
No answer	37	26%
	140	100%

Ark. .3680 and (Mrs.) Barbara McDonald, North Little Rock, .3978. 200 yards; Tom Gillman, Hot Springs, .3842 and R. Holiman, Hot Springs, .4247. Grand agg.; Mayfield .4231, Gillman .4493, Barbara McDonald .4686 MOA.

In Sporter class: 100 yards; Tom Gillman .6328 and Audrey McDonald, North Little Rock, .6980. 200 yards; Gillman .7119, McDonald .8371. Grand agg.: Gillman .6723, McDonald .7675, Don Crouse, Hot Springs, .8871.

Some points of interest were: All 12 shooters were using Douglas barrels and all were shooting Sierra bullets. In Sporter class, Gillman and McDonald shot rifles chambered for the 6mm Tomcat (Gillman's wildcat—6mm Cotter shortened .300 inch) and Crouse a 6mm Cotter. All three were using a load of 17 grs. of 4759 powder, Crouse with 75 gr. bullets and the other two with 60 gr. bullets.

Thirteen year old Lydina Moore from Fort Worth, Texas, shot a 9½ pound .243 Win. Sporter with Douglas barrel on Mauser action with load of 35 grs. 3031 and 60 gr. bullets. She was third in the 100 yard agg. with .8182, aggregated 1.060 MOA at 200 yards and .9391 in the grand agg.

ST. LOUIS, MISSOURI

Twelve competed in the Missouri State Championship matches for unrestricted bench rest rifles on the Col. Whelen Range, July 8th. Shooting conditions were bad, with a strong fishtailing wind and heavy mirage.

Horace E. Powers from Okmulgee, Okla. won the championship with a .552 MOA NMC aggregate. He was second at 100 yards with .514 and first at 200 with .590.

Ed Walker from Louisville, Ky. was third at 100 with .535, second at 200 with .6045 and second in the NMC with .5697 MOA. Al Roberts from Louisville was first at 100 with .499 and third in the NMC with .604. Dave Walker of the Louisville trio was third at 200 yards with .627 MOA.

TULSA, OKLAHOMA

Thirty-four shot in the night match sponsored by the Tulsa Bench Rest Rifle Club, July 21st; twenty shooting in Varmint Rifle class, ten with heavy bench rifles and four with Sporters.

In the heavy bench rifle class, Mid-Continent Region Director Larry Engelbrecht, Wichita, Kans., cracked Horace Powers' win monopoly at Tulsa, but only barely cracked it—he beat Powers by only a .003 MOA margin.

The aggregate winners were:

Heavy Bench Rifles			
	100 yd.	200 yd.	NMC
Larry Engelbrecht	.439	.4210	.430
Horace Powers	.374	.4920	.433
John A. Young	.463	.4635	.463
R. Hornbeck	.446		
Varmint Rifle			
Tom Gillman	.357	.3775	.367
Jack Morgan	.439	.4005	.419
Ernest Mayfield	.416	.5005	.458
A. W. Ham	.389		
Walt Berger	.366		
Bill Bennett, Jr.		.4440	
Sporter			
Paul Fowler	.742	.9295	.835

Twenty tried a round at the "Flybustin" targets before the record firing started. A. W. Ham was the only one to get a "possible" of five dead flies (hits touching the fly's body). Horace Powers got four "kills"; no one else got over three.

WAPWALLOPEN, PENNSYLVANIA

Bob Hart's Council Cup Range held a very successful shoot over the week-end of

July 21-22. This is a very beautiful range, high in the hills overlooking the Susquehanna River Valley and this together with the generally fine weather, excellent measuring and statistical crew headed by Paul Aurand, target crew headed by Hap Zeiser and kitchen crew made for a very enjoyable shoot.

The only incident to mar the event was suffered by one relay on Sunday afternoon, which was caught in the only thunderstorm of the day and it was a duzzy, blowing groups out to five inches and shooters like Bob Stinehour and J. Reece clean out of contention. Anybody unfortunate enough to be in it didn't have a chance at aggregate thereafter. It's not a nice thing but it does happen and there is no way the rules can be safely altered to avoid it.

They had 10 entries in the Unrestricted Rifle—Open Class; 26 entries in the Unrestricted Rifle—Limited Class; 13 entries in the Heavy Varmint Class; 2 entries in the Sporter Rifle Class. The aggregate place winners were as follows:

UNRESTRICTED RIFLE

Open Class	Limited Class
100 yds.	

O. Rinehart .4354	R. Stolle .3788
A. Angerman .4440	Ed Shilen .3848
I. Potter .4826	C. Amiller .4468

200 yds.	
C. Kingsley .5795	R. Stolle .4378
O. Rinehart .5899	Ed Shilen .4535
I. Potter .6164	E. Stolle .5182

NMC Agg.	
O. Rinehart .5126	R. Stolle .4083
A. Angerman .5342	Ed Shilen .4191
C. Kingsley .5371	E. Stolle .5112

Heavy Varmint Rifle	Sporter Rifle
100 yds.	

Emily Shilen .3918	Artie Shaw .6480
M. Walker .4588	
G. Harris .4722	

200 yds.	Artie Shaw .8379
G. Harris .4896	
D. Hall .5559	
R. Stinehour .5678	

NMC Agg.	Artie Shaw .7429
G. Harris .4809	
Emily Shilen .5120	
D. Hall .5161	

Despite the fact that there were four distinct classes, at no time was the measuring crew and statistic crew more than two relays behind the shooters and the shooters could learn the results of the previous match before they went to the firing line for their succeeding match. All pay-offs were completed within 30 minutes after the last relay of the last match.

This was a fine example of how well a shoot can be run with an organized crew, handling multiple classes, and it was appreciated and enjoyed by all who attended.

By One of the Competitors

EASTON, OHIO

In the Eastern Region Varmint and Sporting Championships, conducted by the Chippewa Rifle Club on their Easton, Ohio range July 14-15, twenty-one fired the Heavy Varmint class matches, twelve the Light Varmint class and thirteen the Sporter class. Weather varied from early morning ground fog to an all morning light rain. Saturday afternoon and all day on Sunday, light conditions were variable with little or no wind. The very large number of small aggregates reflected the excellent shooting conditions. Eight of the nineteen who completed Heavy Varmint grand aggregates had under half-minute-of-angle aggregates.

The top ranking aggregates in each class were:

(Continued on Page Twelve)

Bench Rest Match Reports

HOT SPRINGS, ARKANSAS

Nine shot Heavy Varmint class and four Sporter class under ideal conditions at the Hot Springs Gun Club night match on June 30th. Tom Gillman was the only competitor to shoot both classes.

High aggregates with Varmint rifles were: 100 yards; Ernest Mayfield, Benton,

Bench Rest Match Reports (Continued from Page Eleven) **Heavy Varmint Rifle**

	100 yds.	200 yds.	Gd. Agg.
Gerald Arnold	.323	.479	.401
Ed Shilen	.312	.517	.415
Lawrence Rucker	.356	.501	.428
Emily Shilen	.349		
R. Snell		.503	

Light Varmint Rifle			
Ed Shilen	.513	.503	.508
Gene Beecher	.598	.457	.528
Crawford Hollidge	.485	.670	.577
L. Rucker	.534		
Paul Gottschall		.645	

Sporter Rifle			
Ed Shilen	.568	.511	.539
D. McClure	.514	.663	.589
K. Turner	.629	.641	.635
Clyde Bonnell	.557		
P. Gottschall		.569	

Ed Shilen shot rifles with Hart barrels on his own Shilen actions, the .222½ cartridge in Heavy Varmint class and 6 m/m International in Sporter class. Gerald Arnold also shot a Hart barrel on Shilen action, in .222 Rem. caliber.

LEWISTOWN, PENNSYLVANIA

Forty-eight shooters competed in the East End Blue Rock Sportsmen's Club annual shoot on July 7th and 8th. The weather was clear, hot (with lots of mirage), and with shifting moderate to strong winds developing in the afternoons. The match and aggregate winners were:

Match Winners—100 yards 5-shot matches

Jim Brobst	.169
Clyde Yockey	.209
Charles Kingsley	.198
Bernice McMullen	.174
Paul Gottschall	.232

10-shot matches

E. D. Seymour	.291
Melvin K. Miller	.306
Homer Culver	.237
Bernice McMullen	.277
Ernest F. Heflin, Jr.	.335

National Course Aggregate

A. H. Angerman	.4022
Ed McNally	.4140
Paul Gottschall	.4228

Match Winners—200 yards 5-shot matches

L. S. Rucker	.410"
George McMullen	.750"
John Smith	.429"
George Clarke, Jr.	.682"
E. A. Smith	.732"

10-shot matches

Clyde Yockey	.680"
L. S. Rucker	.686"
Ralph Stolle	.800"
Ralph Stolle	.808"
Paul Gottschall	.1.090"

National Course Aggregate

Ralph Stolle	.5102 MOA
L. S. Rucker	.5752 MOA
E. A. Smith	.6195 MOA

NATIONAL MATCH COURSE AGG.

L. S. Rucker	.5188 MOA
Homer Culver	.5234 MOA
E. A. Smith	.5276 MOA
Paul Gottschall	.5396 MOA
Eldon Stolle	.5572 MOA

ST. LOUIS, MISSOURI

On July 29th on the Bench Rest Club of St. Louis' Col. Whelen Range, seven shot Sporter class matches in the forenoon and seven (not all the same shooters) fired Light Varmint class matches in the afternoon. Weather conditions were very good this day with scarcely any wind all day; an overcast sky gave very little visible mirage in the forenoon but the sun came out to

produce a heavy mirage in the afternoon.

Club secretary A. M. Freund exchanged rifle and complete outfit, including ammo, with his father, A. J. Freund, for the Sporter matches. A. J. then shot his own 6 m/m International with Hart barrel on Shilen action (which A. M. had shot in the Sporter matches) in the Light Varmint class—and Dad demonstrated quite effectively to the "Boy" that it took more than a good rifle to win matches.

A. J. Freund lowered grand aggregate range records in both Sporter and Light Varmint classes and Frank Muriel made new range records for both 200 yard group (.620") and aggregate in Light Varmint class.

High ranking aggregates were:

Sporter Class

	100 yd.	200 yd.	Gr. Agg.
A. J. Freund	.618	.508	.563
A. M. Freund	.658	.620	.639
Arthur Powell	.580	.757	.6685

Light Varmint Class

A. J. Freund	.571	.668	.6195
Leo Fieser	.751	.7345	.7427
Frank Muriel	.845	.650	.7475
W. Espy	.768		

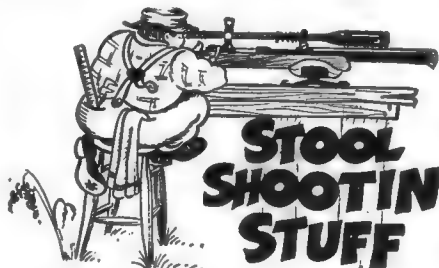
Arthur (Red) Powell shot a heavy barreled Sako in .244 caliber with Weaver 8X scope in the Sporter matches. Leo Fieser shot a factory Sako .22 and Frank Muriel a factory .222 Remington 722 rifle in the Light Varmint matches.

SOUTHBORO, MASSACHUSETTS

Seventeen competed in the Southboro Rod and Gun Club shoot on Aug. 5th under near perfect shooting conditions. Bill Purcell broke the range record for 5-shot group with a .149 inch group.

Charles Kingsley was in the lead for the 5-shot matches at 100 yards with a .283" aggregate but had trouble in the last two 10-shot matches to put him out of the running. Ed Shilen was close to Kingsley for the 5-shot matches with .286" and kept up the pace through the five 10-shot matches at 100 yards to win the grand agg. with a .409 inch average. Bob Stinehour was second in the grand with .4415", Dr. A. H. Garcelon third with .4545", Bill Purcell fourth with .4929 and Mary Hollidge fifth with .5225".

For the season aggregate race, Doc Garcelon holds his lead with a .4407 average, Bob Stinehour second with .4477 ave. and Bill Purcell third with .4672 ave.



Dear Phil:

You undoubtedly will be publishing a full report of the Lewistown matches but for those who have never attended such a colorful event which throughout the years has become one of the most enjoyable in the circuit, I think just a few little comments here will be in order, especially since I suspect that they won't be coming through among the statistics which you receive. The evenings there are always very interesting and because of the fact that the grounds are so pleasant, the clubhouse meals so good and that there is considerable distance to town, there is always a good group of campers. I hardly arrived before

I heard Ed McNally's booming voice say "Hello" and I was certainly glad to see him, and Claire, too, after their long winter in Florida. Mac looked fine and we found out the next day that that good shooting eye of his has not been dimmed a bit and the variations of climate, travel and temperature incidental to trailer living hadn't bothered his gun, either. The competition was very keen and the shooting conditions rather tough but those two features aren't news items to anybody who has attended a Lewistown shoot because they apply to most all of the shoots I have attended there. It wasn't all serious business and we mixed in a few light moments during both day and evening.

I think one of the best laughs I had was at Paul Gottschall, close to the Sunday morning hours on Saturday night. We had all been sitting around for several hours, talking about you know what we always talk about at a shooting match, and out of the thousands of words, a careful listener can put together some ideas that will help his shooting. Paul and I were sitting side by side in the midst of this serious discussion, carrying on an interesting conversation when somebody called across the group and asked Paul for an answer, or his opinion on a certain subject. You folks who know Paul well will recognize that he often weighs a question very carefully before he answers it. On this occasion, Paul hesitated for a minute and then decided that perhaps he had better fortify his answer with another sighter shot from his beer can. In order not to delay the answer too long, he quickly lifted up the beer can over about a 120 degree arc but somewhere on the course, the windage or elevation screws got mixed up and Paul's beer can struck smartly against his lips with the perforations in the horizontal position. I don't know how much beer there was in the can but from the amount that poured out either hole past Paul's cheeks and down on both shoulders and his lap, there was a pretty good working pressure. Well, Paul and some of the rest of us had a good laugh and it wasn't until it occurred again a short time later that Paul decided that perhaps he had better crawl into his tent.

Talking about tents reminds me of how cool the night hours always are at that range. A sleeping bag is a pretty cozy piece of kit when you plan to stay overnight in those Pennsylvania mountains, even close to the 4th of July. During the day time, Clyde Yockey and his new home on wheels sort of had the edge on us because he could load with considerable comfort as a result of his very ample air conditioning unit.

Ed Seymour was there and enjoying the shoot as he always does and he provided, unintentionally a good laugh, and I am not so sure that the old rascal didn't put over the joke from his shoulders to ours. In order to have the 10 shot matches occur in the early part of the day, the range officials had one of the 5 shot matches before the 10 shot events and then followed up with double targets on the board upon completion of the 10 shot matches. Through pretty careful organizational effort, word was passed to the shooters at the 49 benches other than Ed Seymour's, at the command of fire to be ready to release the first shot on the left sighter target on panel 13 which was Ed's. The rain of fire which poured on that sighter target was something to behold. There were small little round holes of countless numbers which smacked into the ten ring but there were others which left long slanting holes as the bullets passed through the target from the flanks of the line. We all had a tremendous laugh and I think Ed was either putting on a good

act or honestly firing at his right hand sighter and didn't at first see the havoc that had struck his left hand target. I can well imagine he has been a heck of a good poker player in his day. At any rate, those who were near by him say that he had on his best poker face when he looked up and inquired what all the joke was about.

During the hours between the matches, there had been a lot of discussion about changing the rule pertaining to disqualification and Lewistown had already seen quite a few disqualifications when Sunday afternoon arrived with wind and mirage that would make you talk to yourself before, during and after your relay. Doc Garcelon with a long way to go back to Maine for an appointment reluctantly had to forego shooting his 5 shot matches in order to get an early start home. Shooting at the left of the empty bench was one of our best. There was a very strong and gusty 3 o'clock wind, along with a violently dancing mirage-obscured target. Our subject shooter carefully analyzed these conditions and made two beautiful targets; however, the referees had a very dim view of those targets because they had been shot at the panel that Doc had been shooting at and by that time, he was well into the Pennsylvania hills on his way home to Maine. In this case everybody had a good laugh, including the shooter but if the same thing had happened during the National Match course of fire, disqualification would have been the penalty and would have ruled the shooter out of the aggregate competition.

Perhaps you as a reader were one of those who filled out the questionnaire. If you did, I am sure your comments will be appreciated by the organization and your careful compilation of ideas and statistics will undoubtedly read with interest the very that Al Angerman worked out. As you can see by his report, he did a thorough and careful job and endeavored to show no bias in either direction. It really is a shame that no more of them were filled out and forwarded to him and I am a little disappointed that no more of the shooters gave this matter careful thought and submitted their answers. I didn't realize there were so many apathetic persons among us. One would think from the gripes that are heard from time to time that this opportunity to express an opinion would have been taken advantage of. I don't know who would be on the roster of those who didn't respond, but if I did know, I imagine I would recognize among them, some whom I have heard being very vocal in their gripes. Wouldn't it be nice if they would put as much effort into constructive suggestions to make our organization a better one.

I think I told you I was "batching" it at Lewistown as I had put Merrie on the airplane at Harrisburg to visit nieces and nephews in Chicago. On the way through to the Eastern Region Varmint matches, my course took me close to that of Paul Gottschall's house and Omar Reinhart. I wanted to see how that jacket turning lathe that Paul designed was working and Paul very generously took a lot of time off from his shop to talk with me about the project. I think we who know him recognize that he is not inclined to go overboard about a new development and he frankly says that he would like to see a broader test on those jackets before fully declaring himself in favor of the turning system. Omar Reinhart, a few weeks prior had gotten so far away from his gun projects that he was picking cherries on a step ladder from a small tree on his grounds. He frankly admits that Esther talked him in to it against his better judgment and when the ladder suddenly shifted and went south while Omar went

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north, Omar got out of further cherry picking duties at the expense of a broken ankle bone. It was really no joke, and when I saw Omar, he was still very handicapped as he hobbled along from place to place on crutches. He says the pain was pretty bad but the surgical bills and hospital bills are paining him more. To make matters worse, he had to miss a couple of shoots and that really hurt him and I arrived just about at the time when he had been without a gun in his hand long enough. He had Paul's jacket turning machine at his house and he demonstrated it as well as turning a batch of jackets for me. He and Esther very graciously put me up over night in the guest room and as a result of all the gun conversation and gadgeting, it wasn't too much of a project to talk Omar into going down to Reeds Run the following day and doing a little shooting. He hobbled along on his crutches to get at the benches but after he was once there, it was clear to see that his shooting eye hadn't suffered any by his fall.

Buster Brown certainly has done a wonderful job at that Reed's Run range. It is in a pretty location and both he and Marie have put a lot of work into it. Merrie and I had just unpacked at the benches when Bernice and George McMullen drove up. We were pleased to see them and the amazement and surprise visible in the expression on their faces was very obvious. Before the evening was over, we had quite a gathering and it was clear to see that there were a number of contestants going into the Eastern Region Varmint Championship matches who wanted to take advantage of the quiet of evening at Buster's range. Cowboy Rucker had his rifle so that it was popping them in one hole pretty good and Dempsey Frost wasn't far behind him. Dempsey, as you know is another one of those fellows who can shoot well, and he is a very excellent metal worker. As a matter of fact, the hot shooters out in that area are very enthusiastic about both his work and his rates. I don't ever recommend buying a thing by price alone but when you find a fellow who does very excellent work and because of a low overhead his prices can be reasonable, he is a pretty good fellow to keep in touch with.

The evening I was at Omar's house, he, Paul and I drove down to Grant Dick's shop. There is another fellow who has done a lot of good chambering and gunsmithing work for the boys in the benchrest game. He has a nice little shop at which he works full time. He is right in the midst of woodchuck country and a host of chuck hunters so the varmint rifles which he makes are pretty thoroughly tested. He is a very capable individual and is fond of hunting. He goes west for a try at antelope practically every year and has come

(Continued on Page Fourteen)

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Stool Shootin' Stuff

(Continued from Page Thirteen)

back with a good many elk, too. These hunting experiences and contacts enable him to talk with authority about sporters and to make the kind for his customers which will serve them best.

The boys at the Chippewa Club put on a fine Regional Varmint shoot. I thought the attendance was pretty good and there are many good shooters coming along in that younger generation. Some of the groups being made would have done credit to a heavy benchrest job. Of course, the weight of the rifle doesn't help much in judging mirage and the bullets are blown off course just as much. There were a few crossfires that had to be untangled and it wasn't until some time after the last shot was fired that it was possible to determine the winner. Gene Beecher was doing a marvelous job and was giving the younger fellows a heck of a good run for their money and wasn't about to let any competitor from Pennsylvania, New York or Massachusetts take the match away from the Ohio boys without a good fight.

Attending such a series of shoots as I did entails a lot of mileage but on the way home, it went fast, partly because we had made arrangements to pick up a new puppy. We had recently been informed of a litter that were grand nieces and nephews of Jock. We knew the breeder well enough to ask him to select one that would be as near like Jock as possible. I don't see how a fellow could have done a better job. Of course, there is very little difference between Gordon markings, if they are thoroughbreds, but in this one, Merrie and I think we can see so many characteristics that were Jock's. Of course, it is difficult to be sure of all of them when the little rascal is little more than two handfuls of silky black fur. Before he was eight weeks old, I took him out for walks with my little Hornet rifle and got him used to its popping. I don't know at this stage if I can say that he likes guns and it would probably be more accurate to say that he takes them in stride. He goes out to the range with me and wanders around in an unconcerned manner or lies down at the bench near me if he is in that mood. He has already attended one "Flybustin'" contest and one benchrest match and he has been poking his nose in everything that I do today as I get ready to leave in the morning for the National Varmint matches at the Council Cup range. He is growing like a weed but is still so small that I am having difficulty containing him in his stall in which Jock used to ride. Incidentally, this puppy's name is Tam O'Shanter, and if he chooses to, he will respond to the call of Tam O' like a veteran.

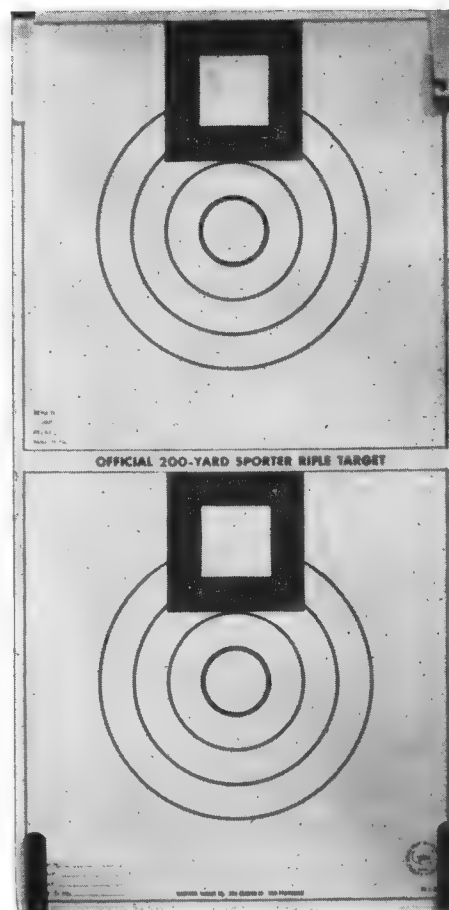
Cordially yours

Crest Strohbecker

A NEW BENCH REST TARGET

As yet the National Bench Rest Shooters Association has not adopted any targets as "official" for their Sporter Rifle class competitions. At the two National Varmint Rifle Championship shoots in 1960 and 1961, a Sporter class program has been fired and unofficial champions in that class recognized. Different targets were used each year for the Sporter class matches. Neither of those were found to be entirely satisfactory.

Competitive bench rest shooters want to be able to see the bullet prints of all shots they fire. Bullet prints of small caliber jacketed bullets in the black areas of target are at best difficult to see at 100



A new target for 200 yard bench rest shooting with Sporter class rifles.

yards on the usual bench rest target butts and practically impossible to spot at 200 yards. For the maximum 8 power scope permitted for the Sporter class, a reasonably large aiming mark is required. The problem has been to provide a suitable size aiming mark with plenty of clear, non-black area where the bullet prints of the forming group may be easily spotted.

At the 1960 National shoot in San Angelo, Texas, a target of official NBRSA 200 yard dimensions, with conventional aiming square but with the space between the two outer ring lines solidly blacked, was used. This target provided acceptable aiming marks for even the lower power scopes but too many shots were "lost" in the black arms and the target was not generally liked.

For the 1961 National at Reed's Run Rifle Range in Augusta, Ohio, a target with heavy black bordered square, set at 45° angle (similar in design to the Bliss Titus testing target), was used. This target, too, provided a reasonably satisfactory aiming point for even low power scopes but, again, too many shots were "lost" in the black areas and this target was not generally liked by the competitors.

Early this season, officials of the NBRSA Eastern Region held a meeting to decide upon targets to be used for Sporter class at the 1962 National, which is being held in the Eastern Region, at Wapwallopen, Pa. The official 200 yard bench rest target has an aiming square suitable for low power scopes at 100 yards range and that target will be used for the 100 yard Sporter class matches.

The official NBRSA 300 meter target has an aiming mark suitable for the permitted Sporter class scopes and it was decided to use this as a basis for a new target for the 200 yard Sporter matches. Wisler Western Arms, Inc., makers of the NBRSA series of official targets, has cooperated in making this new target available. Several

weeks ago we received a supply of samples of the new target from Wisler and have since been giving them a good tryout.

The new target has sighter and record target on the 10½ inch wide by 21 inch long target card, as compared with the standard 300 meter single target on 14 x 14 inch card. The aiming square and ring dimensions are identical with the standard 300 meter target: aiming square 3¼ inch overall with black borders 13/16 inch wide and center buff color square of 1½ inch; center ring 1½ OD and rings spaced 13/16 inch apart. One ring of the standard 300 meter target is eliminated. The dimension within the border line of the new target is 10 x 10 inches.

Using the Redfield 3-9X variable Bear Cub with standard crosshair at the 8X setting I find I can aim quite satisfactorily on the light color center square, but the crosshair intersection very nearly covers it. With this scope set at 6X, the light color center is covered by the crosshair intersection but good aim can be taken on the overall square with good grouping resulting. With a 4X Bear Cub scope with crosshair, the crosshair intersection just about obliterates the aiming square but it is quickly noticeable when you start to get off it and I find it quite possible to shoot good groups with this low power scope. All the foregoing is for shooting at 200 yards range.

I have also done quite a lot of shooting on this target with a 10X Lyman All-American hunting scope with fine crosshair (standard) and with a 10X Unertl 1¼" target scope, and get good results with both, either quartering the center square or using a corner of the square for an aiming point.

The lines of the target circles are thin enough that 6 m/m bullet prints on a line can be quite easily seen with a 20X spotting scope under reasonable light conditions.

From my experience with them, I would consider that the main objection to the targets used for Sporter class competition at prior Nationals has been pretty well eliminated. However, the reception of the new targets by Sporter class competitors at the 1962 National will probably determine whether or not they may be adopted as NBRSA "official" 200 yard Sporter Rifle targets.

Aside from their probable worth for competitive shooting, I very much like these targets for practice and test shooting with scopes up to at least 10X. Since for this latter purpose, with sporters of any respectable accuracy, at least four groups are possible on a single target card, making target cost relatively light.

These 200 yard Sporter targets are presently available from Wisler Western Arms, Inc., 205 Second Street, San Francisco 5, California. The cost is \$3.80 per 100, FOB San Francisco and postage should be included for 6 pounds per 100.

Eastern shooters may obtain the targets from the NBRSA secretary, (Mrs.) Bernice McMullen, 603 West Line St., Minerva, Ohio, for \$3.25 per hundred to NBRSA members and \$3.80 per hundred to non-members, FOB Minerva, Ohio (include postage for 6 pounds per hundred).

P. H. T.

Letters

(Continued from Page Nine)

a very poor loading density.

I use a small wad of KAPOK weighing about ¾ grain, roll it in my fingers and then insert it in the mouth of the case. Just prior to seating the bullet I push the KAPOK wad down onto the top of the powder. Results have been drastic and just fair. Never has it been detrimental to accuracy.

Following are some examples: In a

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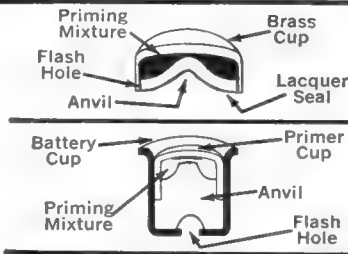
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custom built 243 Win. varmintier on a Springfield action capable of consistently delivering minute-of-angle groups out to 300 yards, I used a light cast bullet load of 13 grains 4759, Ideal #245496 sized .244 and weighing 85 grains with gas check. This load although very light tantalized me for a year. Sometimes it would shoot 10 shot 1 inch groups and then it would be a 7 inch group. Positioning the powder before each shot would give consistently good results but was slow and tedious. The use of KAPOK was the answer. Groups now average 1¼ to 1½ inch at 100 yards, 10 shots.

With 23 grains 4895 in the 30/06 my issue Springfield was delivering 3½ to 4½ inch groups at 100 yards with the Ideal 311467 gas check. KAPOK reduced these groups to 2¼ inches.

Using the Ideal 375449 260 grain gas check backed by 54 grains H570, three shot groups would run 9/10 inch with the 4th and 5th (not necessarily that order) shots

(Continued on Page Sixteen)

YAMA. WOOD

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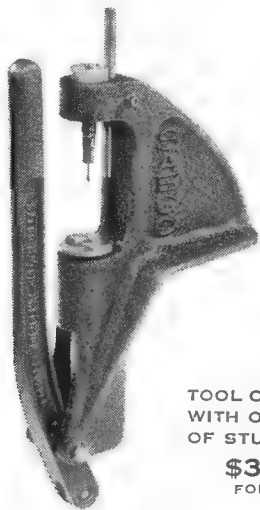
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Letters

(Continued from Page Fifteen)
opening it up to 1 3/10 inch. I still get the
flyers but now they will stay within 1 1/10
inch.

Since most of my jacketed loads are
worked up to as close to 100% loading den-
sity as is practical, the results with them
have been less drastic but nonetheless, im-
provements have been made.

The quantity of KAPOK used doesn't
seem critical. It is clean to work with and
best of all very inexpensive, about \$1.00 per
pound at Sears.

Dave M. Lewis
Seattle, Wash.

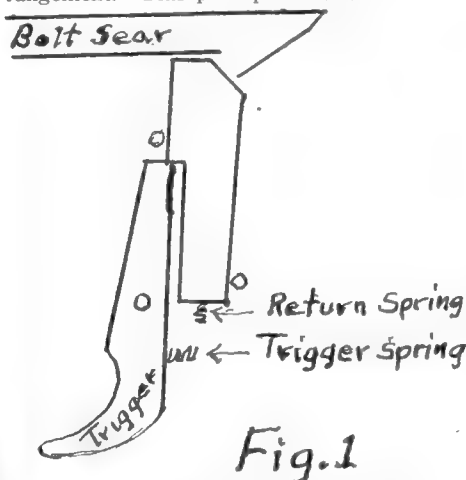
CONCERNING TRIGGERS:

Dear Phil:

Here goes for a hi-velocity load to
shoot at Mr. Meldum on Triggers. I can
hardly believe that I started working on
triggers way back in 1932, 30 years ago.
Nate Wallace, Santa Margaritta Rancho,
Nevada, got me started because he has
touchy hands and fingers, women have told
me that he has the smoothest hands and
fingers they have ever felt and they spent
much time putting his hands back where
they belonged.

It was months before I got a trigger
as smooth as his finger and it still had bugs
in it. At that time there had to be a sear,
and when the trigger was smooth enough,
it wasn't safe. It took lots and lots of
work on something apparently quite simple
before leverage and engagement began to be
something like correct. That SOME-
THING turned out to be PRECISION,
precise precision in ALL fittings and move-
ments.

In about 1939, after 7 years work, a
trigger was produced that was good enough
to satisfy the Remington people, who in-
stalled it in their Mod. 37 rifle. Figure 1
will show the principle only, not the ar-
rangement. This principle in effect is used



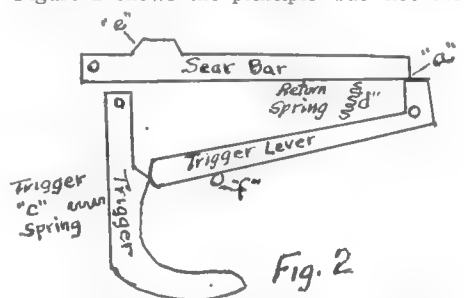
today by most of the commercial triggers
and the principle shown could hardly be
called new at that time. It was a lot of ar-
rangement that did it. Remington used
the trigger on small bore and with a pull
not less than 3 pounds. This type trigger
when properly made and adjusted, had a
finger movement of about .002 inch, that
small a movement could hardly be seen and
was not felt by the finger. Movement was
limited by adjusting screws and the sear
engagement was on the order of .003 to .005
inch. Each trigger was best to be adjusted
to the gun it was to work in for best re-
sults.

The proper steel, the proper normaliz-
ing of it and the correct fitting of the sears
was very essential. Those surfaces had to
be SMOOTH, as smooth as possible to get,
otherwise creep might be felt or even seen.
When properly made and adjusted they
stood up for years without further adjust-

ment. One was installed in a gun for H.
P. Hinkle, just a common deer hunter at
that time but now a tough benchrest. A
few years ago he brought that gun and trig-
ger back to me, saying it wasn't working
right. It had creep and variation that had
developed very recently. I do not remem-
ber but he said it was installed only 19
years ago, and he asked what I intended to
do; he thought I certainly should replace
or at least fix it for nothing after that short
length of time. I figured that we'd been
friends for the last 40 years and if we were
to be friends for the next 40, I'd better fix
it.

What had happened to it has likely
happened to others, too. You can't touch
anything he owns but what it's got greas-
t or oil on it. The trigger was oily, he al-
ways kept it that way; I wormed that out
of him. What had happened was that
through 19 years it had gathered dust, stick-
ing to that oil and making a grinding com-
pound. Naked eye showed nothing but
under the glass, the sears showed a slight
matting of their surface; that's what did it.
A short time with a fine hone and it was
good as ever again. I told him there would
be no charge if he'd promise to use no oil
on it through the next 19 years. All this is
related to show how PRECISE PRECI-
SION must be.

Along about 1940 I developed a SEAR-
LESS trigger, in that the finger lever was
not connected with the sear at all. Hinkle
had one of these installed 18 or 20 years
ago and it is still slick as ever; oil and dust
could not hurt this trigger anywhere it
could reach or he'd have had that in too.
Figure 2 shows the principle but not the



arrangement of it. It consists essentially
of 6 parts; the case, not shown, the trigger,
the trigger lever, the sear bar and 2 springs,
plus pins for bearings. Note that the sear
at point "a" is not connected with the trig-
ger and so not with the finger either. The
engagement of the trigger lever and the
sear bar is very broad, it can be from .010
to .030 inch, it makes no difference. The
trigger end of the trigger lever is ground on
a radius from the pin hole and touches the
trigger on a line, not a sear. The trigger is
held against the trigger lever by a spring.
The sear bar rests on the trigger lever at
the point "e"; the angle of this contact can
hold the bolt sear or let it slip forward and
push down lightly on the trigger lever at the
point "a". With pressure on the trigger
from the spring "c" the trigger lever is held
down and letting the bolt sear go forward
to strike the primer.

Suppose the pressure of the spring
"e" is 3 pounds against the end of the trig-
ger lever. It is obvious that if an equal pull
is exerted on the trigger in the opposite di-
rection, the pressure on the trigger lever will
be released and the trigger lever is free to
move up and disengage the sears at "a".
BUT THE TRIGGER DOES NOT
MOVE AT ALL IN DOING THIS, the
pressure is released without the trigger
moving so that if a dial indicator is placed
behind the trigger, no dial movement will
occur in firing the piece. The spring "d"

is a return spring to bring the trigger lever and sear bar back to place. This trigger is safe for shooters who understand its use; exceedingly hard slamming the bolt down 3 or 4 times can cause the trigger bar to slip and discharge on a 3 pound pull. It will not do for a deer hunter wilder than the deer he hunts.

For benchrest use, a safety is placed at the point "f". When the bolt is withdrawn, the safety is automatically set and the gun cannot be fired until the safety is released. With the safety, this trigger can be reliably used with a pull of about ½ ounce and there is NO FINGER MOVEMENT AT ALL, it can be THOUGHT off, if you are that kind of a thinker.

Let it be impressed with indelible tattoo; for successful operation with this or any type trigger with a pull of ¼ or ½ ounce, EVERYTHING MUST BE OF UTMOST PRECISION. Every moving part must be FREE, NO PLAY. All moving parts and sear faces must be made of fine, normalized steel, and sears must be HARD and polished to a fine smooth surface.

Most any commercial trigger made today can be reworked if necessary and brought down to a very light pull. Some of our boys out here are doing just that. And if they do not operate satisfactorily, they have not complied with the conditions of PRECISION, FREE, NO PLAY.

The commercial triggers of today are sear operated, directly connected to the finger, so if there is creep or grit a sensitive finger can feel it. Mounting one of them in a gun for very light pull and SAFETY requires that they be fitted and worked in for THAT gun. Any person who can learn to shoot benchrest and place next to low man, can learn to work in a trigger to suit if he will stay with it.

Perhaps someone who has better power of description than I have can work out a "do-it-yourself" program to improve triggers. Such a person should be able to show with pictures and illustrations and point out how to work on them so a person with but little experience could do it himself. I hope someone like that turns up; it would certainly be of great help to a lot of shooters.

The BIG point I am trying to drive over in this letter is that ALL benchrest triggers must be adjusted to PRECISE PRECISION.

John B. Sweany
187A Silverado Trail
Calistoga, California

THIS AND THAT:

Dear Phil:

A few months back in P. S. someone mentioned half-jacket bullets in revolvers and how-come light loads are inaccurate. I'm on my second 44 Magnum and I know well of what he mentioned. I think maybe I know what is happening with light loads and half-jacket bullets. Believe me, this is only theory—I'd never argue on it.

Both of my 44's, after slugging, miked .431". From two makers of half-jacketed 44's I've never had one go over .429". Now it's just possible that a light charge does not upset a jacketed bullet enough to fill the grooves, what with gas leakage, barrel cones and cylinder clearance. I've spent some time in digging into a plie of sawdust, and the ones fired with light loads sure don't look like they filled the grooves completely, if they did at all.

H-380 POWDER: Here's one that's been giving me fits. Quote Speer #5 loading manual; "This number fills a gap between 4320 and 4350—etc. etc." Quote August GUNS & AMMO re Bob Hutton on powders: "H-380 Spherical; Here is a powder I should know more about and intend to

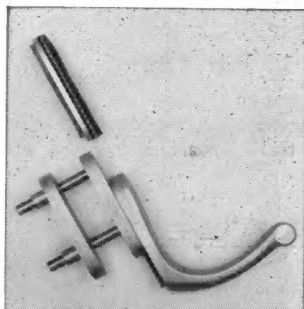
(Continued on Page Eighteen)

FOR THE SHOOTER BY A SHOOTER

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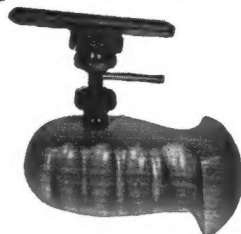
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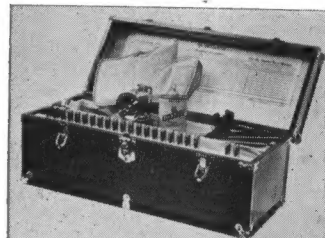
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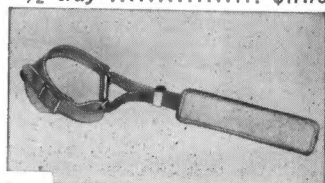
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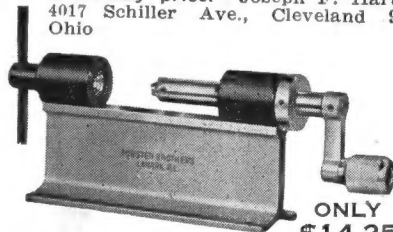
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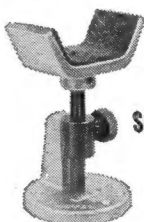
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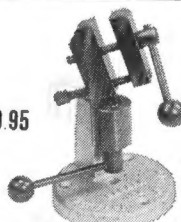
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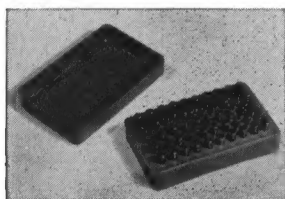
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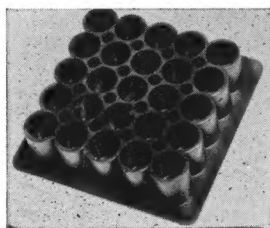
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Letters

(Continued from Page Seventeen)
rectify that condition but fast. It falls between 4320 and 4350, etc. etc."

As the well worn phrase goes, does she or doesn't she? If you will page through Speer's manual you will note that for 90% of the cartridges, this number falls flat on its kisser on this burning rate bit. Besides, velocities are pretty poor to boot at maximum loadings. Oddly, the old 220 Swift thrives on the stuff, and exactly as stated—between 4320 and 4350.

I've been playing around with a 6 m/m wildcat based on a .243 Win. case necked back to 28° shoulder. It holds about 2 grains less water than a standard .243. I've found the following loads to be safe and shoot well: 70 gr. Hornady H. P. with 41½ grs. 4064. Same bullet with 43 grs. 4320. Same bullet with 47 grs. 4350.

Now, this H-380 looked like a good bet. Should take 44 grs., eh? Glad I played it cool and started with 42 grains. Well Sir, did we have fun opening the bolt handle. Primers flatter-n-ell and cratered. Back to the arsenal and try again. Different primer and double-check that scale. Same thing all over. After 2 makes of cases, 3 makes of primers and two different cans of powder bought from two different dealers, I forgot all about H-380. But the groups were really good. You just can't win.

TWIST VS PRESSURE & VELOCITY:
Why doesn't someone come up with a good technical article on barrel twist versus pressures and velocities? We have chambered three rifles with this 6 m/m reamer

of mine and very much alike they are. We can interchange fired cases. Now, two of these jobs have 14" twists and one a 12" twist. The 12" twist job has a grove diameter of .0002" over the two 14" twist jobs. We can throw out the bullet versus bore diameter as of now.

The 12" twist job will not accept the loads that we have found to work fine in the two 14" twist barrels. The loads must be cut back no less than 1 to 1½ grains (same components used). WHY?

Now if a sharper twist raises pressures and we cut back to what we suppose creates equal pressures, is the velocity the same (at like pressures)? Somewhere someone said "pressure is the maker of velocity." If so, less powder, with identical pressures would mean identical velocity. I cannot buy this, not with extremes in case capacities such as we have today in identical calibers. The only thing I've ever seen in print on twists was by P. O. Ackley in his handbook where he states, "As much as 35% of a powder's energy is used to rotate a bullet, which means only 65% is left for forward propulsion."

I wish I had the time and means to chamber 3 identical barrels in 10", 12" and 14" twists to the same cartridge, eliminating all variables other than twist, and take chronograph and pressure checks. I suppose the Government has done this, way, way back, on the '06, but I've never read about it anywhere.

I'll sign off here as I'm beginning to sound like the kid that's always saying "Why buddy, why?"

Robert Hummel
Mohnton, Penna.

CONCERNING THE .45 CALIBER AUTO CARTRIDGE

By Fred W. Hallberg

We often hear of the faux pas made by amateur experimenters in ballistics but when they are made in high places they are not so well advertised. This is the story of one such blooper concerning the military .45 caliber automatic pistol cartridge. It dates back almost to World War II and while all parties involved, including myself, are still around not any of them are now professionally engaged in small arms ballistics. This writer is more or less retired. The other major party is currently engaged with rockets.

Many .45 caliber competitive pistol shooters will recall an epidemic of broken extractors suffered some years ago. Suddenly and for no apparent reason .45 caliber extractors were popping all over the place. A comparison of the old with the new extractor then currently manufactured showed that the new types were somewhat stronger due to a radius left at the bottom of each angular cut whereas the cuts on the old types were sharp. But that was not the reason for the malfunctions.

Ordnance announced that the trouble was caused by the very narrow extractor groove then being cut into the .45 caliber case. When fired, the case set back and jammed the extractor in such fashion that it soon crystallized and broke. Examination of such a fired case shows that the extractor strikes the forward bevel of the narrow cut groove as the case moves backward.

The accompanying photograph illustrates what I am talking about. The case with the larger extractor groove is properly designed and manufactured. The case with the narrow groove is not. Yet the difference in manufacturing cost between the two is so negligible (if there is any difference at all) that there is no reason why

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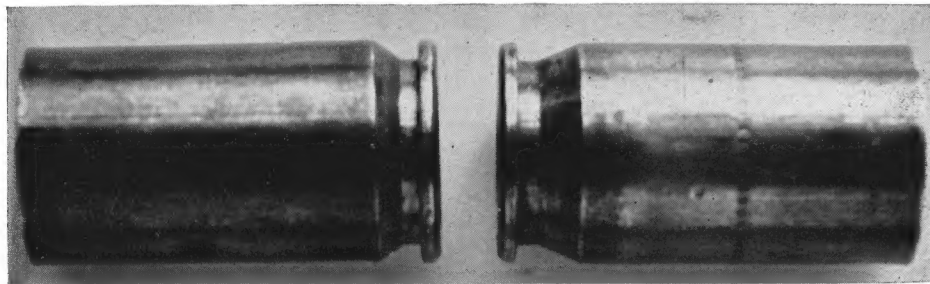
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Two caliber .45 auto cases. The case with the wide extraction cannelure is properly manufactured. The one with the narrow cannelure is not.

Ordnance should accept such a product. If their procurement inspectors had been shooters it is improbable that such ammunition would have been accepted for general issue particularly since the drawings of the cartridge show the wide extractor groove. But it is not required that these inspectors know anything about the product with which they are working. Imagine General Motors hiring engineers who do not know how to drive a car. You can read about driving and shooting but unless you actually do these things you cannot really know what it is all about.

But there is another facet to the story that I do not believe Ordnance is aware of. At least they were not aware of it up until three years ago. The basic problem dates back about fifteen years when Dr. Albin Benson became ballisticsian at Frankford Arsenal. He continued in that capacity until the end of Korea. Doc. Benson was a top quality Physicist and statistician. His invention of a water bullet trap to catch bullets fired from machine guns during function tests was a real contribution to ballistics testing procedure. Not only did it eliminate the dirt and dust of a sand trap but it also packaged the spent bullets so that they could readily be recovered and removed for sale as scrap. Tons of such scrap was gathered up each day.

But Doc. was not a shooter. And therein lay the basis of many a discussion and argument between the two of us. The last time Doc. visited my home I told him

I would some day write this article even though I would have to admit that the statements made were only reflections of my own opinion. He told me to go ahead and on the strength of that we poured some more soul-searching solvent and continued our conversation until late into the night.

As with all small arms ammunition, specifications call for a certain basic velocity for the .45 caliber ball bullet but they do not state how that velocity is to be determined. Custom dictated that .45 caliber velocity should be obtained by firing the cartridge through a fixed five inch barrel attached to a Springfield '03 action. Readings were at that time taken individually by a chronograph operator and the firing was, of course, single shot. The procedure was sound and it produced a velocity figure that was quite free from outside influences. Figures obtained could readily be duplicated within the given tolerance range.

But Doc. had gotten the notion that true velocities could only be obtained in the weapon in which the cartridge was to be fired—in this case the auto loading pistol. This meant that a cartridge producing a velocity of, say, 810 foot seconds in a fixed barrel would now produce a velocity of only about 750 foot seconds in the pistol because the difference is absorbed by the action of the weapon. In order to obtain this extra 60 foot seconds the cartridge had to be more heavily loaded and the allowable pressures had to be increased by at least 3000 pounds. Worst of all, from a production

point of view, the action and reaction of each pistol is not the same and this fact introduced some very troublesome variances that are difficult to work with in a production system. Of course, I am talking about the production of super-accurate ammunition. Such ammunition is not at all difficult to make if all factors are properly considered and applied.

This overloading of the .45 played as big a part in producing malfunctions in the pistol as did the narrow extraction cannelure. One condition simply supplemented the other.

The overloaded cartridge also has its effect on the target shooter. To the novice and the average GI the heavily loaded cartridge makes the pistol a more difficult weapon with which to hit anything. The effect can readily be determined by firing some of the older cartridges and comparing them with cartridges of more recent issue. The old cartridges will feel like reduced target loads and they operate the pistol with a marked softness compared with the sharp reaction obtained from the newer cartridge.

This change in testing procedure produced a more powerful cartridge for the military. But the point is—they did not obtain it by design. They obtained it by accident and by so doing they have made the .45 pistol a more difficult weapon to master. But there is also a sunny side to the story. The burp gun now fires with more zip. Maybe that was what was wanted all along.



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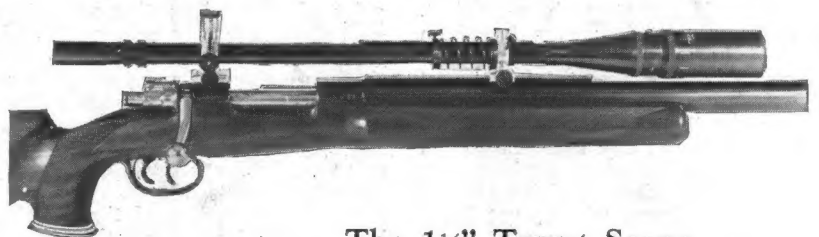


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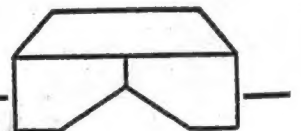
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